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EDITED BY

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A PRELIMINARY STUDY

OF THE

SOUTH AFRICAN RUST FUNGI

By ETHEL M. DOIDGE

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a. Leaf of *Oxalis corniculata* showing the spermogones on the upper surface.
b. Under side of leaf showing aecidia.
c. Enlarged view of aecidia.

A Preliminary Study of the South African Rust Fungi.

By Ethel M. Doidge.

The first collections of South African Uredinales were made by Medley Wood in Natal and by MacOwan in the Cape Province, and these fungi were for the most part described by Kalchbrenner and Cooke in Grevillea in the years 1880–88; many of their type collections have found their way into the National Herbarium, and have been available for comparison. The earlier Transvaal collections were made by Dr. Pole Evans and his colleagues, and were described by Hennings in Engler's Botanische Jahrbücher and by Sydow in the Annales Mycologici, and all were reviewed in Sydow's Monograph.

Subsequent to the publication of Volume I of the Monograph, a large amount of material gradually accumulated in the Herbarium, much of which was unnamed, and in 1915 Dr. Pole Evans published a paper on the species of Puccinia on Compositae which was intended to be the first of a series of papers dealing with the South African rust fungi, but unfortunately, owing to pressure of administrative work, this intention has never been carried out; at the request of Dr. Pole Evans, the writer has therefore undertaken to make a preliminary systematic study of this economically important group of fungi. It must be realised that little or no systematic collecting has been undertaken, that the species described probably represent a comparatively small percentage of the South African rust fungi, and, as will be pointed out later, that the life-histories of the described species are very imperfectly known. This group, therefore, affords a very promising field of research, both from the point of view of the systematist and of the biologist.

Researches into the biology of South African rusts are limited almost entirely to the early work carried out by Dr. Pole Evans in the Transvaal. He confirmed Arthur's culture work on the connexion between the maize rust and the aecidium on Oxalis, worked out the life-history of Endophyllum MacOwanianum, and carried out a number of inoculations with the Hemileias parasitic on the Rubiaceae. These investigations will be again referred to in the specific descriptions. Dr. Pole Evans also did some work on infection phenomena, and started a study of plant resistance and the breeding of resistant varieties; unfortunately, as in the case of the systematic work, he was unable to find time to continue this line of investigation.

In 1923, Mrs. Pole Evans worked out the life-history of a rust on the besem gras (Tristachya Rehmanni); by means of a series of cultures the teleuto-stage on this host was connected with an aecidium commonly occurring on Vigna angustifolia. This is the only indigenous South African rust of which the complete life-history has been established by cultures, and that there is almost unlimited scope for work of this kind is shown by the number of rusts of which the complete life-history is unknown, and especially the large number of aecidia which have not been connected with any other spore form; of the latter 72 form species are described in this paper.

Classification.

The system of classification adopted is based on Sydow's "Monographia Uredinarum," and no attempt has been made to give a full synonymy or a complete list of the references in literature to the species described; in the case of cosmopolitan species with an extensive synonymy, reference may be made to the "Monograph," where a complete synonymy with dates is available.

The more recent classification adopted by Arthur and his colleagues is based largely on the presence or absence of one or more spore forms in the life cycle of the fungus. This idea has been developed further by Sydow in his more recent publications; the germination of the teleutospore, immediately or after a resting period, being also used as a diagnostic character. It is at present impossible to determine the latter character in the majority of the South African rusts, since they are only known from dried herbarium material, some of which is many years old. The life-histories of a very large percentage of the species are very imperfectly known, as may be gathered from the following schedule; only one indigenous heteroecious Puccinia has been connected with its aecidium, and the aecidia of many of the introduced heteroecious species do not occur in this country. Such a system of classification, therefore, whether desirable or otherwise when the life-histories of the fungi are fully known, is quite impracticable in a preliminary study of the rusts of a country like South Africa, and if adopted would only lead to unnecessarily large additions to the synonymy.

To quote a case in point, the fungus here described as Ravenelia Evansii, in Sydow's classification becomes Dendroecia Evansii because only the teleutospores were known; the aecidial stage having now been discovered, this species would have to be transferred to the genus Cystotelium; if a uredo-generation were observed, both these names would lapse into synonymy and the species would be called Longia Evansii.

Schedule of Species of Puccinia, Uromyces and Ravenelia

according to the spore forms known.

P.=Puccinia. U.=Uromyces. R.=Ravenelia.

* indicates that the aecidium is unknown in South Africa.

Family of Host.	I, II, and III known: Heteroecious.	I, II, and III known: Autoecious.	I and III known.	II and III known.	Only III known.
Compositae.		P. Stoboeae. P. Stoboeae var. Woodii.	P. Gerberae. P. MacOwani. P. Pienaarii.	P. Absinthii. P. berkheyicola. P. Cyani. P. Chrysanthemi. P. Cichorii. P. Dimorphothecae. P. Felicise. P. Kalchbrenneri. P. Kalchbrenneri var. valida. P. Hypochoeridis. P. oedipus. P. Koedoëensis. U. Bidentis. U. Melantherae.	P. gerbericola. P. aecidiiformis. P. Othonnae. P. Printziae. P. africana. P. inflorescenticola. P. vernonicola.
Cucurbitaceae.		P. Cephalandrae.			
Valerianaceae.		U. Valerianae.			
Rubiaceae.		P. punctata.		P. Pentanisiae. P. dimorphae.	P. Anthospermi. P. Galopinae. P. Woodiana. P. pretoriensis. P. bakoyana. P. Vangueriae.
Acanthaceae.		P. Blepharidis.	P. Thunbergiae.	P. Chaetacanthi.	P. Isoglossae.
Solanaceae.		P. afra.	P. Atropae.	P. Lycii.	
Labiatae.		*P. Menthae. P. Salviae-runcinatae. *P. leonotidicola.	P. Becii. P. Ocimi. P. Plectranthi.	P. Leucadis. P. luandensis. P. aethiopicae.	P. galerita. P. pallens.

Family of Host.	I, II, and III known: Heteroecious.	I, II, and III known: Autoecious.	I and III known.	II and III known.	Only III known.
Verbenaceae.					P. natalensis. P. lippiivora.
Convolvulaceae.		U. Ipomoeae.	P. Ipomoeae-panduratae. P. Batatae.	U. comptus.	P. holosericea. U. Greenstockii.
Asclepiadaceae.				P. Pachycarpi.	P. Schlechteri.
Apocynaceae.		P. Tabernaemontanae.		P. callistea.	
Loganiaceae.					P. Lindaviana.
Oleaceae.			U. Hobsoni.		P. exhauriens.
Sapotaceae.				U. Mimusops.	
Umbelliferae.		*P. Hydrocotyles.		U. Heteromorphae. U. Polemanniae.	P. Alepideae.
Oenotheraceae.				P. Krookii. P. Oenotherae. U. capensis.	
Guttiferae.		U. Hypericifrondosi.	P. Hyperici.		
Malvaceae.					P. Abutili. P. heterospora. P. Malvacearum.
Tiliaceae.				R. atrides.	
Anacardiaceae.				U. barbeyanus.	
Euphorbiaceae.		U. prominens.	P. Tragiae. U. natalensis.	P. Acalyphae. P. Evansii. U. Cluytiae.	
Burseraceae.				U. paradoxus.	
Rutaceae.					P. Fagarae. P. lemanensis. P. Kentaniensis.
Zygophyllaceae.				U. Trollipi.	
Geraniaceae.		P. granularis.		P. Monsoniae. P. Pelargonii-zonalis.	
Leguminosae.	*U. striatus.	*U. appendiculatus. *U. Fabae. R. natalensis. R. MacOwaniana.	R. Evansii. R. inornata. R. deformans.	P. Zorniae. U. Argyrolobii. U. Harmsianus. U. Dolichi. U. Mucunae. U. Pseudarthriae. R. glabra. R. escharoides. R. Indigoferae. R. Pienaarii. R. stictica. R. pretoriensis. R. Tephrosiae. R. Bottomleyae. R. Woodii. R. minima. R. baumiana. R. Le Testui. R. Elephantorhizae.	U. Bolusii. U. ventosa. U. ermelensis. R. Peglerae. R. Dichrostachydis.
Rosaceae.	*P. Prunispinosae.			U. Alchemillae.	
Saxifragaceae.				P. deformans.	
Crassulaceae.					P. exanthematica.
Anonaceae.			P. Popowiae.		

Family of Host.	I, II, and III known: Heteroecious.	I, II, and III known: Autoecious.	I and III known.	II and III known.	Only III known.
Caryophyllaceae.		*P. Behenis. *U. caryophyllinus. U. inaequialtus.			
Aizoaceae.			P. Mesembryanthemi.	P. Galeniae.	
Chenopodiaceae.		*U. Betae.			
Polygonaceae.	*P. Polygoni-amphibii.	*U. Polygoni.		U. Rumicis.	
Santalaceae.		P. Stonemanniae.			
Orchidaceae.				P. Satyrii.	P. aurea.
Iridaceae.				P. dehiscens. P. Dieramae. P. Moraeae. P. Gladioli-crassifolii. U. Sparaxidis. U. Ecklonii. U. Freesiae. U. Geissorhizae. U. Gladioli. U. transversalis. U. Ixiae. U. Zeyheri. U. Anomathecae. U. delagoensis. U. Melasphaerulae. U. Moraeae. U. bonae-spei. U. Watsoniae.	P. capensis. U. Kentaniensis. U. Babianae. U. Romuleae.
Amaryllidaceae.		U. badius.		P. Pole-Evansii. U. Hypoxidis.	
Liliaceae.		*P. Asparagi. P. Myrsiphylli. P. amadelpha. P. Kraussiana. P. Kalchbrenneriana. U. Lachenaliae.		P. polycampta. P. ranulipes. P. contecta. P. Ornithogali-thyrsoides. P. Drimiae. U. Albucae.	P. Phyllocladiae. U. Aloes. U. Bulbinis. U. circinalis. U. bylianus.
Juncaceae.				P. Junci.	
Commelinaceae.				U. Commelinae. U. pretoriensis.	
Araceae.			U. Stylochitonis.		
Cyperaceae.				P. Bulbostylidis. P. Cyperi-tagetiformis. P. Pottsii. P. transvaalensis. P. Hennopsiana.	
Graminaceae.	*P. coronata. *P. magnusiana. P. Phragmitis. P. Tristachyae. *P. dispersa. *P. graminis. P. Maydis. *P. Cynodontis.			P. aristidicola. P. Arundinellae. P. Eylesii. P. torosa. P. Chloridis. P. Digitariae. P. Rottboelliae. P. versicolor. P. erythraëensis. P. rufipes. P. advena. P. purpurea. U. Chloridis. U. Peglerae. U. Eragrostidis. U. leptodermus. U. tenuicutis.	U. Ehrartae-giganteae.

The species are arranged in the same way as in Sydow's Monograph under the families of the host, the classification of Engler and Prantl being followed.

The following table shows the distribution of the species among the families of the flowering plants.

Analysis of Species.

according to the Family of the Host.

Family of Host.	Hamaspora.	Phragmidium.	Uromyces.	Puccinia.	Diorchidium.	Sphaerophragmium.	Hemileia.	Ravenelia.	Kuehneola.	Sklerka.	Melampsora.	Schroeterlaster.	Pucciniastrum.	Milesina.	Uredinopsis.	Endophyllum.	Puccinioidea.	Cronartium.	Coleosporium.	Aecidium.	Caeoma.	Uredo.
Compositae	—	—	2	22	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	18	—	1
Cucurbitaceae	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1
Dipsaceae	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—
Valerianaceae	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Rubiaceae	—	—	—	9	—	—	6	—	—	—	—	—	—	—	—	—	—	—	1	10	—	—
Acanthaceae	—	—	—	4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	1
Solanaceae	—	—	—	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—
Labiatae	—	—	—	11	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	—	—
Verbenaceae	—	—	—	2	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—
Boraginaceae	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—
Convolvulaceae	—	—	3	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—
Asclepiadaceae	—	—	—	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3
Apocynaceae	—	—	—	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Loganiaceae	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—
Oleaceae	—	—	1	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Ebenaceae	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	2	—	—
Sapotaceae	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Umbelliferae	—	—	2	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—
Araliaceae	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	1
Cornaceae	—	—	1	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Melastomataceae	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—
Combretaceae	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Guttiferae	—	—	1	1	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—
Malvaceae	—	—	—	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—
Tiliaceae	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	1
Vitaceae	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	1	—	—
Rhamnaceae	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—
Balsaminaceae	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—
Sapindaceae	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—
Anacardiaceae	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Euphorbiaceae	—	—	3	3	—	—	—	—	—	—	2	2	—	—	—	—	—	—	—	5	1	1
Polygalaceae	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1

Family of Host.	Hamaspora.	Phragmidium.	Uromyces.	Puccinia.	Diorchidium.	Sphaerophragmium.	Hemileia.	Ravenelia.	Kuehneola.	Sklerka.	Melampsora.	Schroeterlaster.	Pucciniastrum.	Milesina.	Uredinopsis.	Endophyllum.	Puccinlosira.	Cronartium.	Coleosporium.	Aecidium.	Caeoma.	Uredo.
Burseraceae	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1
Rutaceae	—	—	—	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Zygophyllaceae	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1
Geraniaceae	—	—	—	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Leguminosae	—	—	11	1	1	1	—	20	1	—	—	—	—	—	—	—	—	—	—	6	—	7
Rosaceae	1	1	1	1	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—
Saxifragaceae	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Crassulaceae	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Anonaceae	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Ranunculaceae	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	3	—	—
Caryophyllaceae	—	—	2	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Portulacaceae	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—
Aizoaceae	—	—	—	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Chenopodiaceae	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Polygonaceae	—	—	2	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Loranthaceae	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—
Santalaceae	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Moraceae	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—
Salicaceae	—	—	—	—	—	—	—	—	—	—	2	—	—	—	—	—	—	—	—	—	—	—
Orchidaceae	—	—	—	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—
Zingiberaceae	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1
Iridaceae	—	—	17	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	—	—
Amaryllidaceae	—	—	2	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	—	—
Liliaceae	—	—	8	11	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	—	—
Juncaceae	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Commelinaceae	—	—	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Araceae	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Cyperaceae	—	—	—	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2
Gramineae	—	—	6	20	1	—	—	—	—	—	—	—	—	2	1	—	—	—	—	—	—	3
Filicineae	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Totals	1	1	71	183	2	1	7	21	2	1	6	2	1	2	1	1	1	1	3	72	1	29

Manipulation.

The study of the South African species of the Uredinales has been based entirely on dried herbarium material, the spores keeping most of their characters unchanged for an unlimited time, although, with the exception of the teleutospores, the colours are apt to fade. Spores were examined in 50 per cent. lactic acid, but were mounted dry to study

the sculpturings of the epispore, which are often invisible when the spore is wet. The germ pores of the uredospores often show quite distinctly in lactic acid, but if they are obscure, boiling for about half a minute in a drop of lactic acid often brings them clearly into view.

In the genus Ravenelia, the position and number of the cysts must be studied; if these swelled too rapidly in lactic acid they were mounted in a mixture of equal parts of 95 per cent. alcohol and pure glycerine. In this the cysts swell very slowly, thus giving time for observation.

The spores of species of Puccinia and Uromyces were all drawn to the same scale with the aid of the camera lucida, using a Zeiss objective D and a compensating ocular No. 12, and those of Ravenelia with a No. 8 ocular; all were reduced by one half in reproduction.

ACKNOWLEDGEMENT.

I wish to record my indebtedness to the staff of the National Herbarium for assistance with the nomenclature of the host plants, particularly to Dr. Phillips for allowing me to make use of the manuscript of his forthcoming book on the Genera of South African plants, to Miss S. M. Stent, who kindly identified all the grasses, and to Miss Verdoorn and Miss Hofmeyr, who undertook the laborious task of verifying the names of all the other host plants. For material for comparative purposes, I have to thank the Director of Kew Herbarium, the Director of the South African Museum, and Dr. Weir, who is in charge of the pathological collections at Washington. I also have to thank Miss Wakefield of Kew Herbarium for valuable assistance and for advice with regard to several rather puzzling species of Puccinia on Compositae and on Cyperaceae; in the former case there appears to be some confusion amongst the numbers of the type collections as represented at Kew and at Pretoria; this is dealt with more fully in connexion with the individual species. To Dr. Sydow I am indebted for kindly examining and reporting on a number of species of Melampsoraceae, most of which have up to the present only been found in the uredo-stage in South Africa.

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UREDINALES.

A group of small fungi, mostly microscopic, which are obligate parasites on the higher plants and on the ferns. Mycelium filamentous, much branched, septate, developing within the tissues of the host, intercellular and with haustoria; producing spores which are borne in sori or rarely singly below the surface of the host, the sori being naked, enclosed by peridia or paraphyses, or compacted into a thin stroma. Spores of five morphological kinds are produced, which are not all present in every genus: (1) spermatia (in spermogones), small, smooth, of unknown function; (2) aecidiospores (in aecidia), catenulate, verruculose; (3) uredospores (in sori), borne singly or rarely in chains, echinulate or verrucose; (4) teleutospores, smooth or variously sculptured, but not echinulate, borne in sori or rarely singly within the tissues of the host. In every species the mycelium eventually gives rise to teleutospores, but one or more of the other spore forms may not develop. The teleutospores, on germination, give rise to a 4-celled promycelium or basidium, each cell of which may produce, on a sterigma, a single basidiospore.

The group may be divided into three families, as follows:—

A. Germination by the formation of an internal basidium of 4 superimposed cells..... **Coleosporiaceae.**

B. Germination by the formation of an external basidium—

a. Teleutospores sessile, firmly compacted laterally into flat crusts or elongated sori, rarely solitary in the tissues of the host..... **Melampsoraceae.**

b. Teleutospores usually pedicellate, free, loosely fasciculate, or catenulate, or united into heads on a common pedicel, never joined laterally in the sorus..... **Pucciniaceae.**

PUCCINIACEAE.

Uredo-sori, when present, without a peridium. Teleuto-sori erumpent, pulverulent or compact. Teleutospores free, loosely fasciculate, catenulate, or united in heads on a compound pedicel, but never joined laterally in the sorus, usually pedicellate, germinating to form a promycelium which is typically 4-celled.

KEY TO THE SOUTH AFRICAN GENERA.

I. Teleutospores free, not joined or catenulate.
  A. Teleutospores solitary, borne on a simple, free, pedicel.
    1. Aecidia, when present, caeoma-like. Uredosori, when present, surrounded by paraphyses. Cells of the teleutospore each with one or more germ pores..... PHRAGMIDIAE.
      a. Teleuto-sori slightly gelatinous; teleutospores 1-pluri-septate..... Hamaspora Koern.
      b. Teleuto-sori not gelatinous; teleutospores typically transversely pluriseptate..... Phragmidium Lk.
    2. Aecidia, when present, usually with a well-developed peridium. Uredo-sori usually not paraphysate. Cells of teleutospore each with a single germ pore..... PUCCINEAE.
      a. Teleutospore 1-celled, germ pore distinct..... Uromyces Lk.
      b. Teleutospore typically 2-celled, with a transverse septum..... Puccinia Pers.
      c. Teleutospore typically 2-celled, with a vertical septum..... Diorchidium Kalch.
      d. Teleutospores pluricellular, muriform Sphaerophragmium P. Magn.
  B. Teleutospores and uredospores borne on slender, fasciculate hyphae, which are erumpent through the stomata..... Hemileia Berk. et Br.
II. Teleutospores more or less closely united in heads on a single composite pedicel..... Ravenelia Berk.
III. Teleutospores catenulate, unicellular, not falling apart..... Kuehneola P. Magn.
IV. Teleuto-sori at first minute, then long, filiform, formed of numerous unicellular, hyaline teleutospores loosely twisted together..... Skierka Rac.

HAMASPORA Koern.

in Hedwigia XVI, 1877, p. 22.

O. Spermogones minute.

I. Aecidia none.

II. Uredo-sori minute, orange-yellow, surrounded by hyaline paraphyses, which curve inwards. Uredospores globose or ellipsoid, solitary, with several germ pores.

III. Teleuto-sori caespitose, filiform, or more rarely pustuliform, sub-gelatinous, light coloured. Teleutospores free, elongated, cylindrical, transversely 1-pluriseptate, hyaline, smooth, with a single germ pore in each loculus, germinating without a resting period; pedicel long, flexuose. Sporidia globose, sub-globose, or ovate.

A small genus of four known specis, all on Rubus sp. There is one South African species and one in tropical Africa.

Hamaspora longissima (Thuem.) Koern.

in Hedwigia XVI, 1877, p. 23; Syd. Monogr. Ured. III, p. 79.

Syn. *Phragmidium longissimum* Thuem. in Flora LVIII, p. 379 (1875); Diet. in Hedwigia, XLIV 1905, p. 113.

Uredo lucida Thuem. in Flora, LIX p. 570 (1876).

II. Uredo-sori hypophyllous, scattered or in groups, minute, yellow, surrounded by paraphyses which are cylindrical, often curved, hyaline 40–60 μ long and 12–17 μ thick. Uredospores globose, sub-globose or ellipsoid, yellow, 20–27 × 18–23 μ; epispore hyaline, 2–3 μ thick, rather sparsely and acutely verrucose, and with 5–6 scattered germ pores.

III. Teleuto-sori hypophyllous, densely crowded, caespitose, filiform, ochraceous. Teleutospores cylindrical, 2–3 septate, rarely only 1-septate, not constricted at the septa, or very slightly so, the terminal cell being usually longer than the others and acute, yellow, 70–140 × 13–18 μ; epispore smooth, thin, about 1 μ thick; one germ pore in each cell; pedicel very long, easily becoming detached, 8–13 μ thick, and up to 200 μ long.

Hamaspora longissima. Teleutospores.

Hosts: Rubus fruticosus L., Garstfontein, Pretoria District, 25.3.11, Erasmus [1267]; Garstfontein, Pienaar, 8.4.11, 30.3.12, 7.7.13, 14.5.13, [1380, 1513, 2184, 6898, 6657]; Duivelskloof, Northern Transvaal, 11.1.15, Doidge [20333].

Rubus Ludwigii E. and Z., Spitzkop, Transvaal, December, 1915; Pott [9776].

Rubus pinnatus Willd., Winterskloof, Natal, 27.6.11, Doidge [1620]; Kentani, Cape Province, 12.6.12, Pegler, 1887 [2350]; Cramond, Natal, 3.6.12, Pole Evans [2404].

Rubus rigidus Sm., Inanda, Natal, Medley Wood 34 [11055]; Northern Transvaal, June, 1906 [144]; New Agatha, Northern Transvaal, 7.8.11, Doidge [1825]; Kentani, Cape Province, 12.6.12, Pegler 2351 [2351]; Komgha, Cape Province, 9.7.12, Pegler [5161]; Wolhuterskop, Pretoria District, 13.9.14 [8387].

Rubus sp., Capetown, October, 1907, Saxton [691].

Distribution: South Africa.

Sydow (*loc cit.*) states that this species produces a uredo-generation twice during the year; the first developes in the early spring on the old leaves which have survived the winter; the second accompanies the teleutospores.

PHRAGMIDIUM Link.

in Spec. Plant. II, 1824, p. 84.

Autoecious.

O. Spermogones, when present, usually epiphyllous, subcuticular, lenticular, honey-coloured.

I. Aecidia caeoma-like, orange-coloured, without peridium, surrounded by hyaline paraphyses which curve inwards. Aecidiospores briefly catenulate, globose to ellipsoid, with numerous scattered germ pores.

II. Uredo-sori, when present, minute, without peridium, orange-yellow, surrounded by paraphyses.

III. Teleuto-sori dark coloured, pulverulent or rather compact. Teleutospores cylindrical, free, transversely 2-pluri-septate (a few spores occasionally 1-septate), pedicellate, coloured, smooth, or verrucose, each cell with 1–4 germ pores. Sporidia globose.

Over sixty species, chiefly parasitic on the family Rosaceae, and on the genera Potentilla, Rosa and Rubus. Only four species are known in Africa, none of them endemic, and of these only one is known to occur in South Africa.

Phragmidium disciflorum (Tode) James.

in Contr. U.S. Nat. Herb. III, 1895, p. 276 : Syd. Monogr. Ured., III p. 115.

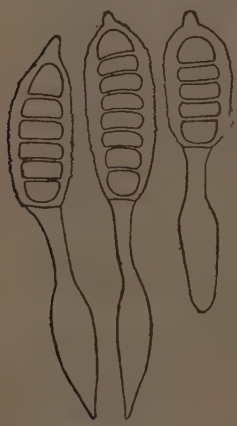
Syn. *Phragmidium mucronatum* Fr. in Summa Veg. Scand., p. 507 (1849).

Phr. subcorticum Wint. in Pilze. Deutschl., 1884, 0. 228.

For extensive synonymy see Sydow, *loc. cit.*

[O. Spermogones epiphyllous, in small groups, flat, 110–150 μ diam., 35–40 μ high, yellow.

I. Aecidia on branches, petioles, leaf veins, and fruits, forming large irregular pustules, which are often confluent ; on the leaves forming round pustules of varying size, orange-coloured, surrounded by paraphyses. Paraphyses erect, clavate or clavate capitate, hyaline, up to 80 μ long and 8–18 μ thick, thin-walled. Aecidiospores globose, sub-globose, or ellipsoid, hyaline, 20 × 17–21 μ ; epispore 2–3 μ thick, sparsely and minutely verruculose, or briefly verruculose-echinulate, with 6–8 germ pores.]



Phragmidium disciflorum. Teleutospores.

II. Uredo-sori hypophyllous, scattered or in groups, very minute, 0·1–0·2 mm. diam., pale orange, surrounded by paraphyses which are clavate and curved inwards, up to 70 μ long and 7–18 μ thick. Uredospores globose, sub-globose, ellipsoid or ovate, yellow, 20–28 × 14–20 μ ; epispore 2–2·5 μ thick, minutely verruculose, and with 6–10 germ spres.

III. Teleuto-sori hypophyllous, scattered or in groups, very minute, or becoming larger by confluence, black. Teleutospores ellipsoid-oblong to cylindrical, 4–8 septate, rarely 3-septate, not constricted at the septa, apex produced into a papilla, which is of varying length (up to 20 μ), paler than the spore or hyaline, spores rounded at the base, dark chestnut-brown, 60–120 × 26–42 μ, upper cell often longer than the rest ; epispore 6–7 μ thick, irregularly verruculose, with 2–4 germ pores in each cell ; pedicel persistent, hyaline, equalling the spore, very much thickened at the base (up to 28 μ).

Host : Rosa spp., Kimberley, 14.7.06, Pole Evans [139] ; Pretoria, 22.7.06 [141] ; Bloemfontein, 3.10.07 [421] ; Lourenço Marques, 8.7.08 [484 ; Durban, 1882, Medley Wood [797] ; Pretoria, 14.5.07 [1171] ; Garstfontein, Pretoria District, 19.2.11 and 17.9.11, Pienaar [1212 and 1892] ; Wellington, 23.8.11, Bottomley [1866] ; Uniondale, Cape Province, 26.5.12, Pienaar [2430] ; Kentani, Cape Province, Pegler, 2377 [9310] ; Port Elizabeth, Cape Province, December, 1921 [15041].

Distribution : South Africa, Europe, Asia Minor, Persia, Madeira, North and South America, Australia, New Zealand.

This is a common rust on cultivated roses. I have not seen the aecidial stage.

UROMYCES Links.

Magaz. d. Gesellschaft naturf. Freunde Berlin, VII p. 28, 1816.

Autoecious or heteroecious.

O. Spermogones deeply immersed, flask-shaped, with conical mouth and ostiolar filaments, honey-yellow.

I. Aecidia at first globose, immersed, then erumpent, cupulate, or cylindrical. Peridium distinct, usually hyaline, margin erect or revolute, lacerate, dentate, or seldom entire. Aecidiospores globose or ellipsoid, often angular; epispore usually verruculose, hyaline, with numerous indistinct, scattered germ pores.

II. Uredo-sori usually minute, with or without paraphyses. Uredospores formed singly on their pedicels, epispore usually echinulate, less frequently verrucose, with several, usually rather distinct, germ pores.

III. Teleuto-sori compact or pulverulent, sometimes paraphysate. Teleuto spores 1-celled on distinct pedicels, almost always with an apical germ pore.

South African species, seventy-one; of which forty-four are endemic to South Africa, six extend to tropical Africa, and four to tropical Africa and East India.

Species parasitic on **Compositae.**

1. **Uromyces Bidentis** Lagh.

in Bull. Soc. Myc., France, 1895, p. 213; Syd. Monogr. Ured. II, p. 3.

Syn. *Uredo Bidentis* P. Henn. in Hedwigia, 1896, p. 251; McAlp., Rusts of Australia, p. 204.
Uredo bidenticola P. Henn. in Hedwigia, 1898, p. 279.
Uredo amaniensis P. Henn. in Engl. Bot. Jahrb. XXXVIII, 1905, p. 106.
Teleutospora Bidentis Arth. et Bisby, N. Am. Flora 7, p. 520, 1922.

II. Uredo-sori amphigenous, mostly hypophyllous, scattered or becoming crowded, minute, round, surrounded by the torn epidermis, pulverulent, rusty-brown. Uredospores globose, sub-globose, or ellipsoid, remotely aculeate, brown, 22–35 × 18–28 μ; epispore 2–2·5 μ thick and with 2–3 germ pores.

[III. Teleuto-sori hypophyllous, often on brownish spots, scattered or in small circles, minute, round, naked, compact, cinnamon-brown. Teleutospores ovate, oblong or oblong-clavate, strongly thickened (up to 10 μ) at the apex, attenuate at the base, smooth, yellowish, or almost hyaline, 28–42 × 16–24 μ; epispore extremely thin; pedicel hyaline, persistent, thick, up to 70 μ long.]

Host: Bidens pilosa L., Inanda, Natal, Medley Wood 230 [10617]; Amanzimtoti, Natal, 10.7.11, Doidge [1610]; Kentani, Cape Province, May, 1914 and 3.2.15, Pegler [7768 and 8854]; Westfalia, Duivelskloof, Zoutpansberg District, 9.1.15 [20341].

Distribution: South and tropical Africa, North and South America, East India, Ceylon, Australia.

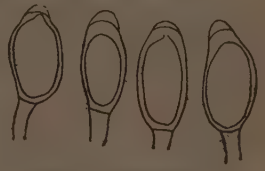
Only the uredospores have been found in South Africa. Sydow (*loc. cit.*) states that this rust produces teleutospores freely in Central America and in the northern part of South America, but only the uredo-form is known in North America, Brazil, Argentine, Africa, East India, and the Canary Islands.

2. **Uromyces Melantherae** Cke.

in Grevillea, X p. 127 (1881–82); Syd. Monogr. Ured., II, p. 6.

II. Uredo-sori epiphyllous, scattered, minute, round, hemispherical, light brown. Uredospores sub-globose, ovate, or ellipsoid, brown, 21–32 × 21–25 μ; epispore brown, about 3 μ thick, sparsely aculeate, and with 3 scattered germ pores.

III. Teleutospores mixed with the uredospores, lanceolate-oblong, apex papillate, attenuate at the base, yellowish, 30–40 × 14–18 μ; epispore smooth, thin (less than 1 μ), strongly thickened at the apex (including papilla, up to 11 μ), germ pore apical; pedicel hyaline, rather thick, equalling the spore.



Uromyces Melantherae. Teleutospores.

Host: Melanthera Brownei Sch. Bip., Umhlanga, Natal, July, 1881, Medley Wood 627 [817 and 11117].

Distribution: South and tropical Africa.

Collected in Natal by Medley Wood, and by Dummer on Melanthera Brownei and M. ugandensis in Uganda.

Species parasitic on **Valerianaceae.**

3. **Uromyces Valerianae** (Schum) Fuck.

Symb. myc., 1869, p. 63; Syd. Monogr. Ured. II, p. 19.

Syn. *Uredo Valerianae* Schum. Pl. Saell. II, p. 233 (1803).
Uromyces Parnassiae Schroet apud Cke. in Journ. of Bot., II, p. 344.
U. Prunella Schneid. in 48 Jahresber. d. Schles. Gesellsch., 1870, p. 120.

O. Spermogones honey-coloured, in small groups.

I. Aecidia hypophyllous or sometimes also on the stems and petioles, usually on pale leaf spots, in round groups or often closely crowded and irregular in arrangement, cupulate, yellow-white, margin revolute, lacerate. Aecidiospores angular-globose, or ellipsoid, densely verruculose, yellow, 18–25 × 16–20 .

II. Uredo-sori amphigenous, usually on indefinite yellow spots, scattered or becoming crowded, minute, punctiform, pulverulent, brown. Uredospores globose, sub-globose, or broadly ellipsoid, sparsely echinulate, yellow-brown or brown, 21–28 μ diam.; epispore about 2·5–3 μ thick, with 2–3 germ pores.

III. Teleuto-sori similar to the uredo-sori, but longer covered by the epidermis, dark brown. Teleutospores globose, sub-globose, or ellipsoid, with a very small hyaline apical papilla, smooth, brown, 20–28 × 16–21 μ; epispore about 3 μ thick; pedicel hyaline, short, fragile.

Host: Valeriana capensis Thun., Cape of Good Hope.

Distribution: **Europe and South Africa.**

We have not collected this species, but it is recorded by Sydow (*loc. cit.*) as occurring in South Africa, and is included here for the sake of completeness.

Species parasitic on **Convolvulaceae.**

4. **Uromyces comptus** Syd.

in Monogr. Ured., II, p. 354.

II. Uredospores mixed with the teleutospores, globose or ellipsoid, echinulate, brown, 22–32 × 18–24 μ; epispore 1·5–2 μ thick.

III. Teleuto-sori amphigenous, without leaf spots or on indistinct yellow spots, scattered, round, remaining for a rather long time covered by the epidermis, 0·5–0·75 mm. diam., sub-pulverulent, black. Teleutospores ellipsoid or ovate, with a broad apical papilla which is paler or often sub-hyaline and up to 7 μ high, smooth, chestnut-brown, 24–38 × 24–28 μ; epispore 4–6 μ thick; pedicel persistent, thick, hyaline, up to 70 μ long.

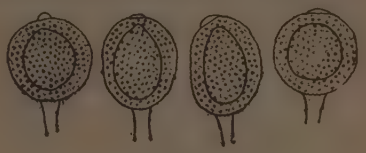
Host: Ipomoea bipinnatipartita on leaves near Okahandja. South-West Africa, Dinter.

Distribution: South-West Africa.

I have not seen this species.

5. **Uromyces Greenstockii** n. sp.

III. Teleuto-sori amphigenous, dark brown, almost black, minute, scattered or becoming somewhat crowded, more or less circular, pulverulent, surrounded by the torn epidermis. Teleutospores globose or sub-globose, more rarely broadly ellipsoid, chestnut-brown, base rounded, apex rounded, papillate, 23–34 × 21–32 μ, apical papilla sub-hyaline, flattened hemispherical; epispore 5–6·5 μ thick, closely and minutely verrucose; germ pore apical, conspicuous; pedicel hyaline, fragile, sub-persistent, up to 40 μ long, collapsing when dry.



Uromyces Greenstockii.
Teleutospores.

Host: Ipomoea Greenstockii Rendl., Kaalfontein, Pretoria District, 18.4.17, Pole Evans [10989].

Distribution: Transvaal.

On several slides made from these leaves by scraping the spores from the pustules a few 2-celled teleutospores were seen. These were chestnut-brown, 40–45 × 23–27 μ, broadly ellipsoid or oblong, rounded at base and apex, slightly constricted at septum; epispore minutely verruculose, 5–6 μ thick, germ pores apical in upper cell, in lower just below septum or about one-third of the distance from septum to base; pedicel as above. Numerous sections were cut, but none of them showed the 2-celled spores; it is impossible to say, therefore, whether or not these belonged to a distinct organism.

6. **Uromyces Ipomoeae** (Thuem.) Berk.

in Grevillea, XL, 1882, p. 19; Syd. Monogr. Ured., II, p. 33.

Syn. *Aecidium Ipomoeae* Thuem. in Flora, 1878, p. 354 (No. 107).
Uredo aterrima Thuem. in Flora, 1878, p. 355 (No. 114).

I. Aecidia amphigenous and also on the fruit, in round groups, at first hemispherical, then open and cupulate, yellow, 300–400 μ diam.; margin of the peridium erect, incised; cells of the peridium oblong to polyhedral, 28–44 × 16–27 μ, outer wall striate, 6–7 μ thick. Aecidiospores angular-globose, yellowish, 20–25 μ diam.; epispore hyaline, about 1 μ thick, densely and very minutely verruculose.

II. A few uredospores occur among the teleutospores. Uredospores sub-globose or broadly ellipsoid, golden-brown, 25–30 × 23–27 μ; epispore golden-brown, 2·5–3 μ thick, echinulate, with 3–4 scattered germ pores.

III. Teleuto-sori amphigenous, scattered, minute, round, about 0·3–0·5 mm. diam., surrounded by the torn epidermis, pulverulent, black. Teleutospores chestnut-brown, becoming almost black, flattened globose, usually broader than long, apex rounded, with a flattened, fuscous papilla, base rounded, 25–34 μ broad and 20–26 μ high; epispore 3–3·5 μ thick, with regular longitudinal striae which radiate from the apex and converge towards the base; germ pore apical; pedicel hyaline, persistent, napiform, up to 50 μ long, swelling in water, the upper part globose or flattened-globose, 13–22 μ diam.

Uromyces Ipomoeae.
Teleutospores.

Hosts: Ipomoea argyreoides Choisy., Somerset East, Cape Province, MacOwan, Rahb. Fung. Eur. 3627 [3967].

Ipomoea convolvuloides Hall, Zilikats Nek, Pretoria District, 14.2.19, Bottomley [12239].

Ipomoea Omanni Rendle, Belfast, Transvaal, February, 1909, Doidge [558].

Distribution: South Africa.

The hosts are indigenous. This interesting species is the type for the new genus Trochodium Sydow (Ann. Myc. 17, 1919, p. 106); it is distinguished from other species of Uromyces by the form of the teleutospores, which have an exospore, marked with ridges resembling lines of longitude on a globe, which swells up noticeably in lactic acid but less so in water; the pedicel also swells in water. Sydow names this species Trochodium Ipomoeae (Thuem.) Syd.

Species parasitic on **Oleaceae.**

7. **Uromyces Hobsoni** Vize.

in Grevillea, IV, 1876, p. 115; Syd. Monogr. Ured., II, pp. 38 and 355.

Syn. *Uromyces Cunninghamianus* Barcl. in Descr. List of Ured. of Simla Pt., III, p. 76 (1890).

U. Cunninghamianus Barcl. form. *somalensis* P. Henn. in Ann. del. R. Ist. bot. di Roma, VI, p. 85 (1895).

O. Spermogones amphigenous.

I. Aecidia on the leaves and stems; when on the leaves, hypophyllous in round groups 1–5 mm. diam. on round brown leaf spots which are often slightly depressed; on the stems densely crowded in elongated groups up to 3 cm. long, which often become confluent and cover the stem completely for many centimetres, causing it to become swollen and deformed; deeply immersed, cupulate; peridium white with a lacerate margin, cells rhomboid, hyaline, rather firmly attached to one another, 20–27 × 15–20 μ, outer wall striate, 5–6 μ thick, inner verrucose, 3–3·5 μ thick. Aecidiospores angular-globose, yellowish, 14–18 μ diam.; wall thin, hyaline very delicately verruculose.

III. Teleuto-sori breaking through the aecidial sori and eventually forming a thick brown encrustation over the whole area formally occupied by the aecidia, pulvinate, dark brown or reddish-brown. Teleutospores brown, ellipsoid, sub-globose, oblong or clavate; apex rounded or rather acute; base rounded or attenuate, 30–45 × 20–27 μ; epispore smooth, 3–4 μ thick, thickened at the apex (up to 8 μ), germ pore apical; pedicel persistent, stout, brownish at the apex, up to 120 μ long, 8·5–9 μ thick at the apex and tapering somewhat below.

Uromyces Hobsoni.
Teleutospores.

Host: Jasminum multipartitum Hochst., Uitenhage, Cape Province, 15.3.09 [579]; Durban, 15.6.21, Landsdell [14820]; Durban, 4.11.21, Bottomley [14243]; Maritzburg, 2.1.23, Sim [15664]; Durban, 30.9.20, Landsdell [17289].

Distribution: Natal, Somaliland, Cameroons, East India.

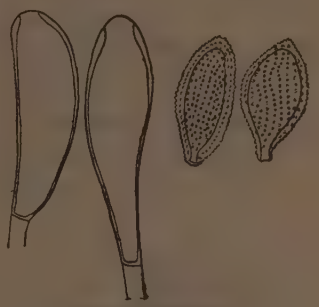
Species parasitic on **Sapotaceae.**

8. **Uromyces Mimusops** Cke.

in Grevillea X, 1882, p. 127; Syd. Monogr. Ured. II, pp. 39 and 355.

II. Uredo-sori hypophyllous, on indeterminate yellow leaf-spots or not producing spots, round, 0·5–1 mm. diam., scattered or grouped irregularly or in circles and becoming confluent, surrounded by the torn epidermis, brown. Uredospores sub-fusoid, clavate or oblong, golden-brown, apex rounded or rather acute, base usually attenuate, 30–40 × 16–21 μ; epispore brown, closely set with rather large hyaline warts arranged in irregular longitudinal lines, the whole thickness of the wall being 3–3·5 μ; germ pores 2–3, near the base.

III. Teleuto-sori similar to the uredo-sori, but compact, dark brown; teleutospores clavate, apex rounded, base attenuate, pale yellow, 52–80 × 18–28 μ; epispore smooth, thin, less than 1 μ at the base, and slightly thicker (up to 3 μ) and darker coloured near the apex; germ pore apical, conspicuous; pedicel, rather thick hyaline, up to 40 μ long.



Uromyces Mimusops.
Teleutospores and Uredospores.

Hosts: Mimusops caffra E. Mey., on leaves, Durban, Natal, 14.5.97, Medley Wood 506 [342, 11116 and 11169]; Lourenço Marques, Portuguese East Africa, 29.6.09 and 20.11.09, Howard [669 and 901]; Durban, 2.7.11, Pole Evans [1604]; Umgeni Beach, Durban, 17.7.12, Doidge [2528]; Port Shepstone, 14.10.12, Pole Evans [5614]; Isipingo, Natal, 13.5.13, Doidge [6629]; Kelso Junction, Natal, 20.12.13, van der Byl [8373]; Umgeni Beach, 27.5.15, Doidge [8982]; Durban, 1.12.15, van der Byl [9174]; Kentani, Cape Province, 8.1.16, Pegler, 2382 [9420]; East London, 24.11.17, Doidge [10909].

Mimusops Zeyheri Sond., De Kroon, Pretoria District, 12.2.26, Malherbe [12807].

Distribution: South Africa.

Species parasitic on **Umbelliferae.**

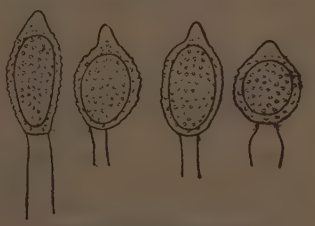
9. **Uromyces Heteromorphae** Thuem.

in Flora, 1877, p. 409; Syd. Monogr. Ured. II, p. 50.

Syn. *Uredo Heteromorphae* MacOwan in litt.
Uromyces papillatus Kalch. et Cke. in Grevillea XI, p. 20 (1882).

II. Uredo-sori usually hypophyllous, on small yellow spots, about 1–2 mm. diam., scattered, minute, about 0·5 mm. diam., round, pulverulent, yellow-brown. Uredospores sub-globose, or often ovate or pyriform, yellowish, 26–40 × 14–24 μ; epispore 3–3·5 μ thick, hyaline, sparsely echinulate, and with three equatorial germ pores.

III. Teleuto-sori similar to the uredo-sori, but darker brown. Teleutospores ellipsoid, ovate or sub-globose, chestnut-brown, with a lighter brown conical papilla, rounded at the base, 22–45 × 18–24 μ; epispore 3–4 μ thick, at the apex (including papilla) up to 10 μ, verrucose, germ pore apical, conspicuous, pedicel sub-persistent, thick, hyaline, up to 55 μ long.



Uromyces Heteromorphae.
Teleutospores.

Host: Heteromorpha arborescens C. and S., Boschberg, near Somerset East, MacOwan (Rabh. Fung. Eur. 3827) [4167]; Natal, Medley Wood 449 [11123 and 11174]; Pretoria, 23.2.11, Pienaar [1197]; Garstfontein, Pretoria District, 26.3.11, Pienaar [1263]; Graskop, Transvaal, 16.1.21, Pole Evans [14687].

Heteromorpha involucrata Conrath., Barberton, Transvaal, 29.8.11, Pole Evans [1856].

Peucedanum sp., Inanda, Natal, Medley Wood 805 [10629]; Bulwer, Natal, April, 1914, Haygarth [7791 and 7796].

Distribution: South Africa.

10. **Uromyces Polemanniae** Kalch. et Cke.

in Grevillea XI, 1882, p. 21; Syd. Monogr. Ured. II, p. 52.

II. Uredospores mixed with the teleutospores, sub-globose or ovate, yellowish, 21–28 × 20–24 μ; epispore yellowish, about 2·5 μ thick, delicately and sparsely echinulate, and with 4 equatorial germ pores.

Uromyces Polemanniae. Teleutospores.

III. Teleuto-sori amphigenous, scattered, very minute, long covered by the epidermis, yellow-brown. Teleutospores chestnut-brown, ovate or ellipsoid, with a light brown or hyaline apical papilla, 3–5 μ high, rounded at the base, 24–23 × 18–22 μ; epispore about 3 μ thick, delicately punctate-verruculose, germ pore apical, conspicuous; pedicel persistent, hyaline, rather thick, and up to 40 μ long.

Host: Polemannia grossulariaefolia E. and Z., near Somerset East, Cape Province, MacOwan 1030.

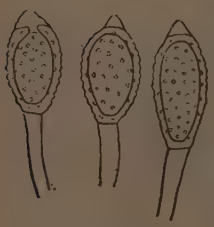
Distribution: South Africa.

This species is not represented in the National Herbarium. Through the courtesy of the Director, South African Museum, I was able to examine part of MacOwan's original collection.

Species parasitic on **Oenotheraceae.**

11. **Uromyces capensis** n. sp.

II. Uredo-sori amphigenous, not on leaf-spots, scattered, minute, cinnamon-brown, pulverulent, surrounded by the torn epidermis. Uredospores sub-globose, ovate or broadly ellipsoid, light brown, 18–25 × 16–20 μ; epispore golden-brown, 2–2·5 μ thick, briefly and sparsely echinulate, and with 2 conspicuous, papillate, equatorial germ pores.



Uromyces capensis. Teleutospores.

III. Teleuto-sori similar to the uredo-sori, but darker brown. Teleutospores ovate to ellipsoid, deep chestnut-brown, with lighter brown, conical, apical papilla, sub-attenuate or rounded at the base, 30–40 × 18–22 μ; epispore about 3 μ thick, at the apex (including papilla) up to 12 μ, verrucose, germ pore apical; pedicel sub-persistent, thick, hyaline, up to 35–6·5 μ.

Host: Oenothera biennis L., on leaves, Wellington, Cape Province, 27.2.11, Doidge [1221].

Differs from the other species of Uromyces on Oenothera in the conspicuously verrucose epispore—others are described as smooth.

Species parasitic on **Guttiferae.**

12. Uromyces Hyperici-frondosi (Schw.) Arth.

Bull. Minnesota Acad. Nat. Sc. XI, 1883, p. 15; Syd. Monogr. Ured. II, p. 57.

Syn. *Aecidium Hyperici-frondosi* Schw. Syn. fung. Carol. super., 1822, p. 68.
Ae. hypericatum Schw. Syn. Fg. Amer. bor., p. 309 (1834).
Ae. hypericorum B. et C. in Grevillea III, p. 61 (1874).
Ae. minutissimum Gerard. in Bull. Torr. Bot. Cl., 1874, p. 40.
Ae. oblongum Bon. Abh. Nat. Ges. Halle. V, 1860, p. 212.
Caeoma hypericatum Link. Spec. plant II, p. 58 (1825).
Trichobasis Hyperici Gerard in Bull. Torr. Bot. Cl. IV., 1873, p. 47.
Uromyces triqueter Cke. in Proceed. Portland Soc. Nat. Hist., vol. I, part II, p. 184.
U. Hyperici Curt. in Burrill, Parasit. Fg. of Illinois, p. 157.
U. pachycephalus Neger in Anal. de la Univers. Santiago de Chile XCIII, p. 785 (1896).
Nigredo Hyperici-frondosi Arth. Résult. Sci. Congr. Bot. Vienne, p. 3441, 1906.

I. Aecidia hypophyllous, usually on round, purplish leaf-spots, 1–4 mm. diam., or without leaf-spots, in small round groups or solitary, minute, briefly cupulate, yellow, margin revolute, incised. Aecidiospores angular-globose, delicately verruculose, hyaline or yellowish, 16–20 × 14–18 μ.

II. Uredo-sori hypophyllous, scattered, very minute, round, yellow-brown. Uredospores globose, sub-globose or ellipsoid, yellow-brown, 18–25 × 14–21 μ; epispore yellowish, about 1·5 μ thick, delicately echinulate and with 3 germ pores.

III. Teleuto-sori hypophyllous, without leaf-spots or usually on small purplish spots, scattered, round, minute, pulvinate, dark brown or black; teleutospores sub-globose, ovate or oblong, apex usually rounded, occasionally truncate or rather acute, base usually attenuate, light brown, 16–30 × 11–18 μ; epispore smooth, about 1 μ thick, very strongly thickened (up to 11 μ) at the apex, germ pore apical, conspicuous; pedicel hyaline or with a brownish apex, thin, equalling or exceeding the spore in length.

Uromyces Hyperici-frondosi. Teleutospores.

Host: Hypericum natalense Wood et Evans, Kentani, Cape Province, 7.11.14, Pegler 1961 [8828].

Distribution: South and tropical Africa, North and South America.

Also recorded on Hypericum Lalandii Choisy from Uganda (Dummer).

Species parasitic on **Anacardiaceae.**

13. Uromyces Barbeyanus P. Henn.

Fg. Aethiop. I, in Bull. Herb. Boiss. I, 1893, p. 107, et in Engl. Bot. Jahrb. XVII, 1893, p. 11; Syd. Monogr. Ured. II, p. 151.

II. Uredo-sori amphigenous, on indistinct leaf-spots or not producing spots, scattered, round, minute, punctiform, long covered by the epidermis, ochraceous. Uredospores oblong or sub-cylindrical, yellowish, hyaline, 32–50 × 16–25 μ; epispore hyaline, 2·5–3 μ thick, sparsely verruculose-echinulate, the small warts being arranged in more or less distinct longitudinal rows; germ pores obscure.

Uromyces barbeyanus.
Teleutospores.

III. Teleuto-sori amphigenous, scattered, round, minute, about 0·3–0·5 mm. diam., surrounded by the torn epidermis, black, pulverulent. Teleutospores ellipsoid or ovate, deep chestnut-brown, with a lighter brown, conical apical papilla up to 10 μ high, usually rounded at the base, 25–40 × 18–25 μ, epispore 3–3·5 μ thick, verrucose; germ pore apical, conspicuous; pedicel hyaline, persistent, thick, about equalling the spore.

Host: Rhus sp., on leaves, Graskop, Transvaal, 16.1.21, Pole Evans [14688].

Distribution: Transvaal, Abyssinia.

Species parasitic on **Euphorbiaceae.**

Cluytia Linn.

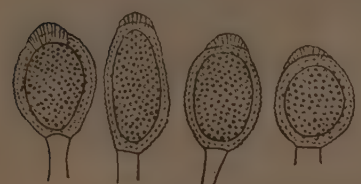
14. Uromyces Cluytiae Kalch. et Cke.

in Grevillea XI, 1882, p. 20; Syd. Monogr. Ured. II, p. 153.

Syn. *Uromyces Cluytiae* Kalch. et Cke. var *erythraeënis*, P. Henn. Fg. Aethiop. I, p. 108, et. in Engl. Bot. Jahrb. XVII, 1893, p. 12.

II. Uredo-sori hypophyllous, scattered, minute, round, about 0·5 mm. diam., surrounded by the torn epidermis, sub-pulverulent, yellow-brown. Uredospores globose, sub-globose, ovate or ellipsoid, yellowish or light brown, 25–35 × 21–28 μ; epispore 1·5–2 μ thick, yellowish, briefly and sparsely echinulate and with 3–4 scattered germ pores.

III. Teleuto-sori usually hypophyllous, scattered, minute, round, about 0·5 mm. diam. surrounded by the torn epidermis, pulverulent, black. Teleutospores ovate, ellipsoid or sub-globose, deep chestnut-brown, rounded at the apex and with an apical papilla, which is rather broad and flat (up to 6 μ high) and somewhat lighter in colour, rounded or attenuate at the base, 30–45 × 22–28 μ; epispore 3–4 μ thick, not thickened at the apex, closely and minutely punctate-verrucose (in section it shows parallel lines so that the spore, especially at the tip appears striolate); germ pore apical; pedicel hyaline, thick, persistent, up to 60 μ long.



Uromyces Cluytiae.
Teleutospores.

Hosts: Cluytia Galpini Pax, Zwartkop, near Maritzburg, Natal, 19.7.18, Doidge [11600].

Cluytia hirsuta E. Mey. Natal, Medley Wood 52, [11127]; Grootfontein, Harrismith District, Orange Free State, 17.5.12, Van der Byl [2318 and 18066]; near Mont aux Sources, Natal, 19.5.20, Doidge [14156].

Cluytia pulchella L., Inanda, Medley Wood [10603]; Lydenburg District, 21.8.12, Pienaar [5147]; Garstfontein, Pretoria District, October, 1913, and January, 1914, Pienaar [7086 and 8402]; Zilikats Nek, Pretoria District, 14.2.19, Doidge [12240]

Distribution: South and Central Africa, Abyssinia.

Euphorbia Linn.

15. **Uromyces natalensis** P. Magn.

in Ber. Deutsch. Bot. Ges. XIV, 1896, p. 374–375 ; Syd. Monogr. Ured. II, p. 171.

Mycelium infecting the whole shoot, and producing spores on most of the leaves ; sometimes the upper leaves are free from fungus. Spermogonia, aecidia and teleuto-sori produced on the same leaves.

O. Spermogones amphigenous, thickly covering the lower leaves ; not found on the upper leaves.

I. Aecidia scattered on the lower leaves, amphigenous, mostly epiphyllous, very small ; external wall of the cells of the peridium thickened and striolate in section, inner wall closely verrucose, Aecidiospores angular-globose, verruculose, 17–22 × 15–17 μ.

III. Teleuto-sori usually hypophyllous, fairly closely crowded, surrounded by the torn epidermis, brown, pulverulent. Teleutospores globose, broadly ellipsoid or ovate, more rarely oblong, often angular, rounded at the base, apex somewhat attenuate above the germ pore, but not thickened, yellow-brown, 20–30 × 16–22 μ ; epispore 2·5 μ thick, densely punctate-verruculose ; pedicel thin, hyaline, deciduous.

Host : Euphorbia epicyparissias E. Mey, on leaves Natal, 1893, Schlechter, Medley Wood.

Distribution : Natal.

Not represented in the Herbarium.

16. **Uromyces proëminens** (D.C.) Liv.

Ann. Sc. Nat. Bot. Ser. III, t. VIII, pp. 371 and 375 (1847) ; Syd. Monogr. Ured. II, p. 158.

Syn. *Uredo proëminens* D.C. Fl. franc. II, p. 235, No. 632 (1805).
Uromyces Euphorbiae Cke. et Peck., 25th Ann. Rept. on the New York St. Mus. of Nat. Hist., 1875, p. 90.
U. pulvinatus Kalch. et Cke. in Grevillea IX, 1880, p. 21.
Nigredo proëminens Arth. Résult, Sci. Congr. Vienne, p. 348, 1906.

For complete synonymy, see Sydow, loc. cit.

Mycelium of the aecidial generation prevading the branches ; infected branches erect with elongated internodes.

O. Spermogones scattered amongst the aecidia, about 115 μ diam.

I. Aecidia hypophyllous, usually covering the lower surface of all the leaves on a branch, but occasionally the lower leaves are free from aecidia, rather small, cupulate, immersed, margin short, crenate ; external wall of the cells of the peridium 4–5 μ thick, internal wall thin, striolate. Aecidiospores globose or ellipsoid, hyaline or yellowish 15–19 μ diam., wall thin, closely and minutely verruculose.

II. Uredo-sori amphigenous and mostly epiphyllous, scattered or in small groups, minute, cinnamon-brown. Uredospores globose or more rarely ellipsoid, light yellow-brown, 18–20 μ diam., or 16–24 × 15–20 μ ; epispore light brown, 1·5–2 μ thick, covered with slender, scattered aculeae ; germ-pores, 4–6, scattered (usually 5), of which one is usually apical.

III. Teleuto-sori, similar to the uredo-sori, but dark brown or black. Teleutospores ovate or ellipsoid, more rarely oblong or globose, brown or light brown, 18–28 × 23–20 μ ; epispore 1 μ thick, rather sparsely verrucose, germ pore apical or somewhat thickened at the pore and usually with a flat or conical papilla ; pedicel short, hyaline.

Uromyces proëminens. Teleutospores.

Host: Euphorbia inaequilatera Sond., near Somerset East, MacOwan (Rabh. Fung. Eur. 3010) [3351]; Durban, 22.4.07, Medley Wood [10362, 809 and 14200]; Hamburg, P.O. Geluk, Wilson, 29.11.11 [1944]; Parktown, Pretoria, 28.3.12, Pienaar [2183]; Garstfontein, Pretoria District, 22.1.13, Erasmus [5596 and 6577]; Arcadia, Pretoria, 16.4.13, Doidge [6592]; Pretoria, 29.9.13, and 23.1.14, Pole Evans [6962 and 7390]; Maritzburg, Natal, 1.12.15, Sim [9202].

Distribution: South Africa, Europe, Asia, North America.

Species parasitic on **Burseraceae.**

17. **Uromyces paradoxus** Syd.

in Ann. Myc. VII (1909), p. 543; Monogr. Ured. II, p. 188.

II. Uredo-sori hypophyllous, often on round, brown leaf spots about 3–6 mm. diam., in irregular round groups, 3–5 mm. diam., minute, about 0·3 mm. diam., sub-discoid, rather compact, brown. Uredo-spores ellipsoid, oblong or sub-globose, often somewhat curved and becoming more or less kidney-shaped, light brown, 25–35 × 16–22 μ; epispore yellowish, 3–3·5 μ thick, often thicker at the sides than at the base and apex, sparsely echinulate, especially in the upper half, often almost smooth near base; germ pores obscure.

Uromyces paradoxus.
Teleutospores and Uredospore

III. Teleutospores mixed with the uredospores or following them in the same sori, of unusual form, such that they might be taken for paraphyses, fusiform, straight or more commonly curved, some slightly curved, others almost sickle shaped, apex abruptly acute or acuminate, slightly attenuate towards the base, light brown, 50–70 × 12–18 μ; epispore thin, smooth, about 1 μ thick and not thickened at the apex; pedicel insignificant.

Host: Commiphora sp., Lourenço Marques, Portuguese East Africa, 13.4.09, Howard [623]; Quelimane, Portuguese East Africa, 7.9.13, Pole Evans [7386].

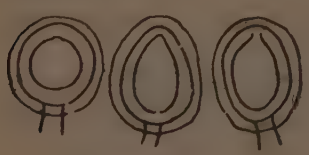
Distribution: Portuguese East Africa.

Species parasitic on **Zygophyllaceae.**

18. **Uromyces Trollipi** Kalch. et MacOwan.

in Grevillea XI, 1882, p. 21, Syd. Monogr, Ured. II, p. 190.

II. Uredo-sori amphigenous, not on leaf spots, scattered, minute, round, surrounded by the torn epidermis, sub-pulverulent, cinnamon-brown. Uredospores sub-globose, ovate or ellipsoid, yellow-brown, 21–32 × 20–28 μ, epispore 2·5–3 μ thick, sparsely echinulate, especially near the apex, often almost smooth, near the base, with 2–3 equatorial germ pores.



Uromyces Trollipi.
Teleutospores.

III. Teleuto-sori, similar to the uredo-sori, sub-pulverulent, black. Teleuto-spores globose, sub-globose or broadly ellipsoid, chestnut-brown; epispore verruculose, in two layers, the inner up to 5 μ thick, chestnut-brown, the outer hyaline about 3–3·5 μ thick, swelling up in water (up to 7 μ thick) and finally becoming sub-deliquescent; germ pore apical; size of spore (without hyaline integument), 22–34 × 22–28 μ; pedicel hyaline, very short.

Hosts: Zygophyllum foetidum Schrad., near Bedford, Cape Province, Trollip (Rabh. Fung. Eur. 3006) [3347].

Zygophyllum sp., Kalkfontein, South-West Africa, 29.7.23, Dinter [20581].

Distribution: South Africa.

Sydow (Ann. Myc. 17, 1919, p. 105) establishes the genus Dichlamys, for Uromyces-like forms with a coloured endospore, and hyaline exospore which swells in water. The above species is renamed Dichlamys Trollipi (Kalch. and Cke.) Syd. and forms the type species of the new genus.

Species parasitic on **Leguminosae.**

Argyrolobium E. and Z.

19. **Uromyces Argyrolobii** sp. nov.

II. Uredo-sori amphigenous, but mostly hypophyllous, scattered or becoming crowded, very minute, sometimes confluent, round to oblong, cinnamon-brown, surrounded by the torn epidermis, pulverulent. Uredospores sub-globose or broadly ellipsoid, brown, 18–25 × 16–20 μ; epispore brown, 2–3 μ thick, briefly and closely echinulate and with about six scattered germ pores.

Uromyces Argyrolobii. Teleutospores.

III. Teleuto-sori, similar to the uredo-sori, but darker in colour. Teleutospores obovate, ovate or ellipsoid, rarely sub-globose, rounded at the apex rounded or sub-attenuate at the base, 18–27 × 16–22 μ, apical papilla none or hemispherical, up to 3 μ high and 6–7 μ broad, hyaline or brownish; epispore 2·5–3 μ thick, closely and coarsely verrucose; pedicel short, hyaline, deciduous.

Host: Argyrolobium amplexicaule E. Mey, on leaves and stipules, Mooi River, Natal, 21.3.17, Mogg [10075].

Distribution: Natal.

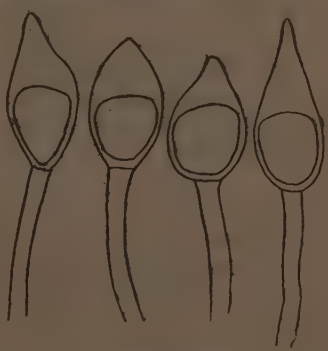
Differs from U. Dolichi in its teleutospores, which are mostly obovate, and more coarsely verrucose.

Aspalathus L.

20. **Uromyces Bolusii** Mass.

in Kew Bulletin, 1901, p. 168; Syd. Ann. Myc. XX, 1922, p. 55.

III. Teleuto-sori scattered, pulvinate, compact, early becoming naked, at first light brown, later becoming dark brown, 0·5–1 mm. in diam. Teleuto-spores ovate, ellipsoid or pyriform, conically attenuate or rounded at the apex, rounded or sub-attenuate at the base, light brown, darker at the apex, 28–42 × 25–32 μ; epispore smooth, 1·5–2 μ thick, very strongly thickened at the apex; pedicel persistent, stout, 5–10 μ thick, and up to 170 μ long.



Uromyces Bolusii. Teleutospores.

Host: Aspalathus pachylobus Benth., Montague Baths, 8/96, Bolus [7597].

Distribution: South Africa.

I am indebted to the Director of Kew Herbarium for the opportunity to examine this species.

Borbonia Adans.

21. **Uromyces (Teleutospora) ventosa** Syd.

in Ann. Myc. 22, p. 235, 1924.

III. Teleuto-sori hypophyllous, occasionally a single one is epiphyllous, scattered or more or less thickly distributed over the whole leaf surface, not on leaf spots, discoid, compact, round, 0·5–1 mm. diam., rusty-brown or chestnut-brown. Teleutospores extremely variable in form and size, ovate-ellipsoid (with conically-acuminate apex) to oblong or even lanceolate, strongly thickened (10–20 μ) smooth, at first hyaline, pale chestnut-brown when mature, darker at the apex, 35–50 × 15–24 μ; epispore about 2 μ thick, pedicel firm, hyaline, thick, up to 180 μ long. The teleutospores germinate without a resting period.

Host: Borbonia sp. on leaves, Stellenbosch, August, 1923, Duthie, Van der Bijl 1246.

Distribution: South Africa.

The above description is from the original; this species is not epresented in the National Herbarium.

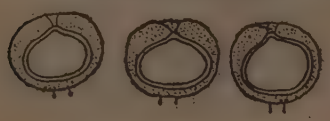
Crotalaria L.

22. **Uromyces Harmsianus** (P. Henn.) Doidge.

Syn. *Uredo Harmsiana* P Henn. in Hedwigia XXXIX, 1900, p. 154; Syd. Monogr. Ured. IV, p. 476.

II. Uredo-sori hypophyllous, not on leaf spots, in small irregular groups, round to elliptic, minute, often becoming confluent, cinnamon-brown, surrounded or partly covered by the white blistered and torn epidermis, pulverulent. Uredospores ellipsoid to globose, light brown, 22–27 × 20–24 μ; epispore light brown, 3–3·5 μ thick, very delicately echinulate and with 4 to 6 scattered germ-pores.

III. Teleuto-sori, similar to the uredo-sori, but darker. Teleutospores chestnut-brown with a yellowish or light brown margin, globose, flattened-globose or bluntly conoid, often broader than long, 20–27 μ long and 27–32 μ broad, broadly rounded or almost flat at the base, rounded at the apex; epispore in two distinct layers, the inner chestnut-brown, about 1·5 μ thick, the outer hyaline or very light brown, swelling up in water and then 5–7 μ thick and covered with rather broad, shallow pits; germ-pore apical, conspicuous; pedicel deciduous short, hyaline.



Uromyces Harmsianus. Teleutospores.

Hosts: Crotalaria lanceolata E. Mey., on leaves II, Inanda, Natal, Medley Wood 199 [11120, 11168]; II and III, Scottsburgh, Natal, 5.7.13, Pole Evans [6834].
Crotalaria laburnifolia L., Barberton, 10.6.03 [147].

Distribution: South Africa.

The teleutospores are similar in type to those of U. Trollipi, and if Sydow's recent classification is to be adopted, would fall in the genus Dichlamys as D. Harmsianus.

Dolichos L.

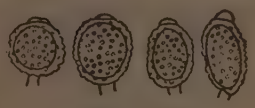
cfr. also Phaseolus.

23. **Uromyces Dolichi** Cke.

in Grevillea X, 1882, p. 127; Syd. Monogr. Ured. II, p. 122.

II. Uredo-sori not on leaf spots, amphigenous, mostly hypophyllous, minute, cinnamon-brown, scattered or becoming crowded, often covering the whole leaf surface, round or elliptic, surrounded by the torn epidermis, pulverulent. Uredospores golden-brown, globose, sub-globose or broadly ellipsoid, 18–30 × 16–20 μ; epispore golden-brown, 2·5–3 μ

III. Teleuto-sori, similar to the uredo-sori but darker brown. Teleutospores chestnut-brown, globose, ovate or ellipsoid, rounded at the apex, rounded or attenuate at the base, 17–25 × 15–22 μ, usually papillate at the apex, papilla when present hyaline or sub-hyaline, flattened hemispherical, 6–7 μ broad and 2·5–3 μ high; epispore 2·5–3 μ thick, not thickened at the apex, closely set with rounded warts, irregularly arranged, germ pore apical; pedicel short, hyaline, deciduous.



Uromyces Dolichi.
Teleutospores.

Hosts: Dolichos spp., on leaves, Garstfontein, Pretoria District, 30.3.12, Pole Evans [2225]; same locality, 7.3.15, Pienaar [8901].

Eriosema cordatum E. Mey., Inanda, Natal, January, 1881, Medley Wood, 621, [361 and 11121].

Eriosema salignum E. Mey., Winkle Spruit, Natal, 5.6.12, Pole Evans [2371].

Eriosema spp., Lemana, Zoutpansberg District, 14.8.11, Doidge [1800]; Entumeni, Zululand, June, 1916, Haygarth [14182].

Rhynchosia Harmsiana L., Kentani, Cape Province, 13.6.14, Pegler [7811].

Rhynchosia Memnonia D.C., Hebron, Pretoria District, 15.3.15, Pole Evans [9053].

Rhynchosia totta D.C., Pretoria, 28.3.12, Pienaar [2186].

Rhynchosia spp., Natal, Medley Wood 557 [11114]; Wharncliffe, East London, 5.3.12, Pienaar [2171]; Tugela Valley, near Mont aux Sources, 18.5.20, Doidge [14163].

Distribution: South Africa.

The hosts are indigenous.

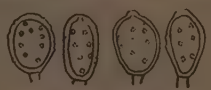
Eriosema D.C.

cfr. Dolichos.

Indigofera L.

24. **Uromyces ermelensis** n. sp.

III Teleuto-sori scattered, hypophyllous, on indistinct yellowish leaf spots or not producing spots, minute, round to oblong, often near midrib, pulverulent, cinnamon-brown, about 0·5 mm. diam. Teleutospores light brown, ellipsoid or ovate, rarely sub-globose and occasionally asymmetrical and angular, rounded at the apex, rounded or sub-attenuate at the base, not papillate or with a small, flattened, hyaline, apical papilla, 16–25 × 13–18 μ; epispore 1·5–2 μ thick, not thickened at the apex, with a few scattered warts arranged in irregular longitudinal lines. Pedicel short, hyaline, deciduous.



Uromyces ermelensis.
Teleu ospore .

Host: Indigofera sp., Davel, Ermelo District, 1912, McCall [5598].

Distribution: Transvaal.

There are several collections of uredo on Indigofera, but nothing to connect them with the teleuto-stage described above. The spores agree with those described for Uredo maranguensis P. Henn., but I fail to find any paraphyses.

U. ermelensis differs from U. Dolichi in the more slender, thinner walled spores and the markings on the epispore.

Medicago L.

25. **Uromyces striatus** Schroet.

Abhandl. Schles. Ges. f. vaterl. Cultur. 1869/72. Breslau, 1872, p. 11 ; Syd. Monogr. Ured. II, p. 115.

Syn. *Uromyces Medicaginis* Pass. in Thuem. Herb. Myc. oecon. No. 156 (1872).
U. Medicaginis falcatae Wint. Pilze. Deutschl., p. 159 (1884).
for full synomymy and bibliography, see Syd. loc. cit.

[O. Spermogones hypophyllous, numerous, scattered between the aecidia.

I. Aecidia evenly distributed over the whole lower surface of the leaf, cupulate, margin white and broadly reflexed ; aecidiospores angular-globose or ellipsoid, densely and minutely verruculose, orange-coloured, 18–23 μ diam.]

II. Uredo-sori not on leaf spots, amphigenous, scattered, minute or of medium size, round to irregular or elliptical, up to 1·5 mm. long, pulverulent, cinnamon-brown, surrounded by the ruptured epidermis. Uredospores globose, sub-globose or ellipsoid, 20–25 × 15–20 μ ; epispore about 2 μ thick, sparsely and finely echinulate, very light brown, with three to seven (often four) scattered, papillate germ-pores.

Uromyces striatus.
Teleutospores.

III. Teleuto-sori similar in form to the uredo-sori and intermingled with them, but darker brown. Teleutospores obovate or sub-globose, occasionally ellipsoid, apex rounded at the base with a small hyaline papilla, rounded or more rarely attenuate, 18–25 × 15–18 μ ; epispore, 1·5–2 μ thick, distinctly striate, the striations being formed by shorter or longer longitudinal grooves ; germ-pore apical; pedicel short, deciduous, hyaline.

Hosts : Medicago sativa L., on leaves and stems, Platrand, Standerton, Burtt Davy [26] ; Pretoria, February, 1906, Pole Evans [57] ; Daspoort, Haenertsburg, January 1906 [69] ; Pretoria, 27.4.07, Faure [312] ; Umbelusi, Portuguese East Africa, 3.8.08, Howard [510] ; Robertson, Cape Province, 30.7.09 [689] ; Middelburg, Cape Province, 16.5.10 [1200] ; Groenkloof, Pretoria, 18.2.14 [7400] ; Bloemfontein, Orange Free State, Potts, 17.6.15, [9048] ; Groenkloof, Pretoria, 23.7.15, Pole Evans [9096].

Distribution : South Africa, Europe, North and South America, East India, New Zealand.

The aecidia, have not been observed ; these occur on the leaves of Euphorbia Cyparissias, which has not been found growing in South Africa ; it is not known whether the aecidium may develop on any of the numerous South African species of Euphorbia.

Mucuna Adans.

26. **Uromyces Mucunae** Rabh.

in Hedwigia XVII, 1878, p. 62 ; Syd. Monogr. Ured. I, p. 117.

II. Uredo-sori hypophyllous, very minute, punctiform, scattered over the whole leaf surface, pulverulent, cinnamon-brown or uredospores mixed with the teleutospores, sub-hyaline, ellipsoid, sub-globose or ovate, 18–24 × 16–20 μ ; epispore hyaline, 1–1·5 μ thick, very briefly and finely echinulate, and with 4 to 5 sub-papillate scattered germ pores on one face.

III. Teleuto-sori, similar to the uredo-sori but dark brown, almost black. Teleutospores deep chestnut-brown, globose or flattened globose, broadly rounded at base and apex, and often broader than long, 18–22 μ long, 18–25 μ broad, epispore 2–3 μ thick, slightly thickened at the apex (up to 6 μ), and thickly set all over with small, rather acute warts, which are arranged longitudinal rows, germ-pore apical, obscure ; pedicel rather thick, hyaline, up to 30 μ long. Paraphyses club-shaped, hyaline, curved or bent, wall on convex side thicker than on concave.

Uromyces Mucunae.
Teleutospores.

Host: Mucuna utilis Wall., on leaves, Salisbury, Rhodesia, 17.3.21, Mundy [15446].

Distribution: Rhodesia, East India.

Mucuna utilis, the velvet bean, is sometimes regarded as a variety of M. pruriens the host on which this rust was originally described.

Phaseolus L.

27. **Uromyces appendiculatus** (Pers) Lk.

in Observ. II, 1816, p. 28; Syd. Monogr. Ured. II, p. 120.

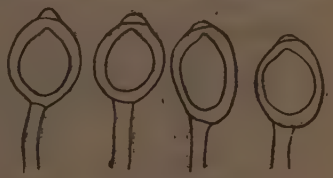
Syn. *Uromyces Phaseolorum* de By., Ann. Sc. Nat. Ser. IV, Vol. XX, p. 80 (1863).
U. Phaseoli Wint. Pilze Deutschl. p. 157 (1884).
Nigredo appendiculata Arth. Résult. Sci. Congr. Bot. Vienne, p. 343, 1906.

[O. Spermogones whitish, in small groups.

I. Aecidia hypophyllous, usually on yellow or yellow-brown spots, in small round groups, 2–3 mm. in diameter, cupulate, white, with a lacerate, revolute margin. Aecidiospores angular-globose or ellipsoid, often oblong, densely and minutely verruculose, hyaline, 18–36 × 16–24 μ.]

II. Uredo-sori usually hypophyllous, not on leaf-spots or on vague brownish spots, scattered or becoming crowded, minute, soon becoming naked, surrounded by the torn epidermis, cinnamon-brown. Uredospores globose, sub-globose or ovate, very light brown, 18–28 × 18–22 μ; epispore light brown, 1–1·5 μ thick, echinulate, and with two germ-pores.

III. Teleuto-sori similar to the uredo-sori, but dark brown or black. Teleutospores sub-globose, ovate or ellipsoid, rounded at the apex and with a rather large hemispherical, hyaline or sub-hyaline papilla, rounded at the base, chestnut-brown, 24–25 × 18–25 μ, epispore smooth, 3–3·5 μ thick; germ-pore apical; pedicel hyaline, rather slender, about the same length as the spore or somewhat longer.



Uromyces appendiculatus. Teleutospores.

Hosts: Phaseolus vulgaris L., on leaves and pods, Zoutpansberg, 19.3.09 [605]; Daspoort, Pretoria, 9.3.09 [616]; Wonderboom, Pretoria District, 13.5.11, Pole Evans [1493]; Pretoria, April, 1911, Lounsbury [1505]; Nelspruit, Transvaal, 16.7.12, 26.6.12, and 24.6.13, Hall [2536, 5157, and 6849]; Kentani, 1.5.14 and 5.2.15, Pegler [7769 and 8850].

Vigna Catjang Walp., on leaves, Cedara, Natal, 8.5.22, Staples [15432]; Bathurst, Cape Province, 22.5.15, Preddy [20426].

Dolichos axillaris E. Mey., Natal, Medley Wood [840].

Dolichos sp. Lemana, Zoutpansberg, 14.8.11, Doidge [1827].

Distribution: South Africa, Europe, North and South America, North and East Africa, Manchuria, Japan, Australia.

The aecidia have not been found in South Africa and according to Sydow (loc. cit.), are seldom formed. This rust is often a serious pest in bean fields.

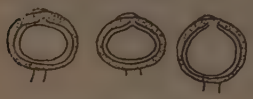
Pseudarthria Wight et Arn.

28. **Uromyces Pseudarthriae** Cke.

in Grevillea X, 1882, p. 127; Syd. Monogr. Ured. II, p. 126; Ann. Myc. XX (1922), p. 55.

II. Uredo-sori hypophyllous, irregularly scattered, minute, partly concealed amongst the leaf-hairs, pulverulent, cinnamon-brown. Uredospores yellow-brown, sub-globose, ovate or ellipsoid, 18–24 × 16–20 μ; epispore light golden-brown, about 1·5 μ thick, delicately verruculose-echinulate, and with 3 scattered germ-pores.

III. Teleuto-sori, similar to the uredo-sori but dark brown, almost black. Teleutospores deep chestnut-brown, flattened globose (rarely globose), usually broader than long 20–34 μ broad × 16–20 μ high, broadly rounded at base, rounded at apex and usually with a rather flat sub-hyaline papilla 7 μ broad and 3 μ high; epispore 3–3·5 μ thick, not thickened at apex or slightly so (up to 7 μ), closely and minutely verrucose, germ-pore apical, conspicuous; pedicel fragile, hyaline, deciduous.



Uromyces Pseudarthriae. Teleutospores.

Host: Pseudarthria Hookeri, W. and A., Indnda, Natal, 9.6.81, Medley Wood, 598 [11173].

Distribution: Natal.

Only a very brief diagnosis was given by Cooke, the above description is from Medley Wood's specimen.

I think there can be little doubt that this is identical with the uredo-form described by Sydow (Ann. Myc., 1903, p. 324). on the same host collected at Togo.

Rhynchosia Lour.

cfr. Dolichos.

Vicia L.

29. **Uromyces Fabae** (Pers). de Bary.

Ann. Sc. Nat. Ser. IV. t. XX, 1863, p. 72; Syd. Ann. Myc. II, p. 103.

Syn. *Uredo Fabae* Pers. in Rom. New. Magazin, i, 93.
Trichobasis Fabae Cke. Handb., p. 508.
Uromyces appendiculatus Ung. in Einfluss des Bodens, etc., p. 216 (1836).
Nigredo Fabae Arth. N. Am. Flora 7, p. 251, 1912.

[O. Spermogones hypophyllous, growing amongst the aecidia.

I. Aecidia hypophyllous, on yellow leaf spots, solitary or in groups which may be round or elongated and up to 5 mm. long, short, cupulate; margin of the peridium incised, white, revolute. Aecidiospores angular-globose or ellipsoid, densely and minutely verruculose, yellow, 14–22 μ diam.]

II. Uredo-sori amphigenous and on the stem, scattered or circinate, more or less circular, minute or up to 1·5 mm. diam., cinnamon-brown, pulverulent, surrounded by the torn epidermis. Uredospores sub-globose, ovate or ellipsoid, light brown, 20–30 × 18–26 μ; epispore golden-brown, 1·5–2 μ thick, sparsely and finely echinulate, with 3–4 scattered, papillate germ-pores.

Uromyces Fabae. Teleutospores.

III. Teleuto-sori, similar to the uredo-sori but dark brown or almost black. Teleutospores ellipsoid or obovate, apex bluntly acuminate, rounded or sometimes truncate, base attenuate, chestnut-brown, darker at the apex, 27–40 × 18–25 μ; epispore smooth 2–2·5 μ thick, thickened at the apex (up to 12 μ); germ-pore apical, conspicuous; pedicel persistent, brownish, up to 120 μ long.

Host: Vicia Faba L., on leaves and stems, Wellington, 7.11.06, Lounsbury [194]; Grahamstown, Cape Province, 18.1.07 [260]; Grahamstown, Dewar [275]; Skinner's Court, Pretoria, 18.2.11, Pole Evans [1210]; Butterworth, Cape Province, 14.7.14, Pegler [8347].

Distribution: World wide.

The aecidium is unknown in South Africa.

Species parasitic on **Rosaceae.**

30. **Uromyces Alchemillae** (Pers.) Lev.

in Ann. Sc. Nat. Ser. III, Tome VII, 1847, p. 371. Syd Monogr. Ured. II, p. 196.
Syn. *Uredo Alchemillae* Pers. Obs. Myc. I, p. 98 (1796).
U. intrusa Grev. Fl. Edin., p. 436 (1824).
Uromyces intrusa Cke. Handb., p. 519.
Trachyspora Alchemillae Fckl. Bot. Zeit. XIX, p. 250; Arthur, N. Amer. Flora. VII, p. 178.

II. Uredo-sori hypophyllous, arranged in radiating lines between the leaf veins, occupying almost the whole leaf surface, round or elongated, often confluent and covered by large fragments of the torn epidermis, orange-yellow, or even whitish, pulverulent. Uredospores globose sub-globose, ellipsoid or obovate, 16–25 × 14–21 μ; contents orange yellow; epispore hyaline, about 1 μ thick, very delicately echinulate, germ-pores obscure.

III. Teleuto-sori hypophyllous, with the same distribution and form as the uredosori, but scattered and more rarely confluent, minute, round, brown; teleutospores may also develop subsequently in the uredo-sori. Teleutospores sub-globose to obovoid or oblong, rounded at the apex, rounded or sub-attenuate at the base, brown, 26–40 × 20–30 μ; epispore 2–2·5 μ thick, not thickened above, very coarsely and irregularly verrucose, mostly towards the apex; pedicel short or rather long, hyaline, deciduous.

Uromyces Alchemillae.
Teleutospores.

Host: Alchemilla capensis Thun., Haenertsburg, Transvaal, 29.10.25, Pole Evans [20628].

Distribution: South Africa, Europe, Asia Minor, Greenland.

Species parasitic on **Caryophyllaceae.**

31. **Uromyces caryophyllinus** (Schrank) Wint.

in Pilze Deutschl. 1884, p. 149; Syd. Monogr. Ured. II, p. 210.
Syn. *Lycoperdon caryophyllinus* Schrank in Baierische Flora II, p. 668 (1789).
Uredo Dianthi Pers. Syn., p. 222 (1801).
U. bullatum West. in Prodr. Fl. Bot. II, Pars. 4, p. 177 (1866).
U. dianthicola Har. in Journ. de Botanique, 1900, p. 116.
Uromyces Dianthae Niessl. Beitr. 3 Kenntn. d. Pilze in Verh. Naturf. Ver. Brunn X, 1871.
U. sinensis Speg. in Dec. Myc. ital. No. 69.
Nigredo caryophyllina Arth. N. Am. Flora 7, p. 246, 1912.

II. Uredo-sori amphigenous or caulicolous. on pale spots, scattered, minute, round or oblong, soon becoming naked, pulverulent, cinnamon-brown. Uredospores globose, sub-globose or ellipsoid, yellowish-brown, 20–30 × 18–25 μ; epispore 2.5–3 μ thick, delicately and sparsely echinulate and with 4–5 germ-proes.

III. Teleuto-sori confluent and large, often oblong, and clustered on the leaves and stems in circinate or elongated patches, surrounded or partly veiled by the blistered and torn epidermis, sub-pulverulent, dark brown. Teleutospores globose, sub-globose or ellipsoid, with a flat hyaline papilla at the apex, chestnut-brown, 20–31 × 18–24 μ; epispore 2–3 μ thick, densely and minutely punctate, not thickened at the apex; germ-pore apical; pedicel short, hyaline.

Uromyces caryophyllinus.
Teleutospores.

Hosts: Dianthus barbatus L., Sunnyside, Pretoria, 19.12.11, Pole Evans [1984].
Dianthus caryophyllus L., Pretoria, 22.5.06, Pole Evans [130]; Lourenco Marques, 30.7.08, Howard [528]; same locality, 23.9.12 [5178]; Johannesburg, 7.5.13, Van Zijl [6594]; Johannesburg, 28.9.13 [6961]; Pretoria, 7.10.13, Krohn [6969]; Armoedsvlakte, Vryburg, 20.1.15, Henrici [20316].
Dianthus Zeyheri Sond., Zilikats Nek, Pretoria District, 20.2.23, Pole Evans [17032].

Distribution: South Africa, Europe, Asia Minor, Persia, North America, Japan, Australia.

32. **Uromyces inaequialtus** Lasch.

in Rabh. Fung. europ. No. 94 (1859); Syd. Monogr. Ured. II, p. 217.

Syn. *Uromyces Silenes* Fuck. in Symb. myc. p. 61 (1869).
Aecidium sparsum Hazsl. Magyarh. Ueszokgombai, 1877, p. 81.
Nigredo Silenes Arth. N. Am. Flora 7, p. 247, 1912.

[O. Spermogones honey-coloured.

I. Aecidia mostly hypophyllous, usually on conspicuous leaf spots variable in form and colour, in round or elongated groups, cupulate, yellowish white, margin revolute, deeply lacerate. Aecidiospores angular-globose or ellipsoid, closely and minutely verruculose, yellow, 15–22 μ diam].

II. Uredo-sori amphigenous, usually hypophyllous, scattered or in circles, minute, soon becoming naked, pulverulent, cinnamon-brown. Uredospores globose or sub-globose, yellow-brown, 20–27 μ diam.; epispore 2·5–3 μ thick, closely and minutely verruculose and with 2–4-germ pores.

Uromyces inae uialtus. Teleutospores.

III. Teleuto-sori usually hypophyllous or caulicolous, irregularly scattered or in circular groups, minute, rather compact, dark brown or black. Teleutospores globose, sub-globose or ovate, rounded at base and apex, brown, 25–38 × 18–26 μ; epispore smooth, about 3 μ thick, strongly thickened at the apex (up to 9 μ) germ-pore apical; pedicel sub-persistent hyaline, thick, up to 80 μ long.

Host: Silene sp. Percy Sladen Expedition, 1910–11, 6657, Pearson [8407].

Distribution: South Africa, Europe, Asia Minor, Persia.

Our specimen shows only uredo- and teleuto- stages, the description of the aecidia is taken from Sydow (loc. cit.)

Species parasitic on the **Chenopodiaceae.**

33. **Uromyces Betae** (Pers.) Lev.

in Ann. Sc. nat. ser. III, t. VIII, 1847, p. 375; Syd. Monogr. Ured. II, p. 224.

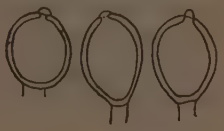
Syn. *Uredo Betae* Pers. Syn. p. 220 (1801).
U. Betarum Lk. in Rabh. Herb. Myc. 582.
U. cincta Str. in Ann. Wetter II, p. 96.
Aecidium Betae J. Kuehn in Rabh. Fg. eur. 1393 and 1393 b. (1870).
Caeoma betarum Lk., Spec. plant II, p. 11, (1825).
Erisibe cinnamomea Wallr. var. *Betarum* Waller. Fl. Crypt. Germ. II, p. 207 (1833).
Trichobasis Betae Lev. in Cke. Handb. No. 1587.
Uromyces Betae Tul. in Ann. Sc. nat. Ser. IV, II, p. 89 (1854).
Nigredo Betae Arth. Résult. Sci. Congr. Bot. Vienne, p. 343, 1906.

[O. Spermogones in small groups, honey-coloured.

I. Aecidia amphigenous, on round or irregular yellow spots, in rather large round groups, which often become confluent and irregular, cupulate, yellow, with incised, reflexed margin. Aecidiospores angular globose, delicately verruculose, hyaline or yellowish, 16–24 × 16–20 μ.]

II. Uredo-sori amphigenous, scattered or arranged in circles, minute, round, surrounded by the torn epidermis, pulverulent, cinnamon-brown. Uredospores globose, sub-globose, ellipsoid or oblong, yellow-brown 21–32 × 16–26 μ; epispore yellow, 2·5–3 μ thick, sparsely and minutely echinulate and with two equilateral germ-pores.

III. Teleuto-sori, similar to the uredo-sori but more compact, dark brown. Teleuto-spores globose, sub-globose or ovate, rounded at the apex, with a minute hyaline papilla, rounded or sub-attenuate at the base, 22–34 × 18–25 μ; epispore smooth about 2·5–3 μ thick, germ pore apical, pedicel short, hyaline.



Uromyces Betae. Teleutospores.

Host: Beta vulgaris L., Glen Avon, Somerset East, 19.8.12 [2538].

Distribution: South Africa, Europe, North America, Australia.

This rust is fairly common on cultivated beet, but specimens sent for identification are rarely in fit condition for preservation in the herbarium. The aecidium has not been observed in this country.

Species parasitic on **Polygonaceae.**

34. **Uromyces Polygoni** (Pers.) Fuck.

in Symb. myc. 1869, p. 64; Syd. Monogr. Ured. II, p. 236.

Syn. *Nigredo Polygoni* Arth. Résult. Sci. Congr. Bot. Vienne, p. 344, 1906.

For extensive synonymy, see Syd. loc. cit.

[O. Spermogones honey-coloured in small groups.

I. Aecidia hypophyllous or caulicolous, often on reddish-violet spots, irregularly grouped, cupulate, white, margin revolute, incised. Aecidiospores angular-globose or ellipsoid, verruculose, yellow, 15–21 × 14–18 μ.]

II. Uredo-sori amphigenous or caulicolous, scattered or in groups, minute, up to 1 mm. diam., round, soon becoming naked, pulverulent, surrounded by the torn epidermis, cinnamon-brown; uredospores sub-globose, ovate or ellipsoid, light brown, 23–30 × 17–22 μ; epispore golden brown, 1·5–2·5 μ thick, closely and minutely verruculose, with 3–4 scattered germ-pores.

III. Teleuto-sori amphigenous or frequently caulicolous, on the leaves, round, scattered; on the stems often oblong and becoming confluent in lines up to 1 cm. long, compact, dark brown, soon becoming naked. Teleutospores brown sub-globose, ovate or ellipsoid, apex rounded, bluntly acuminate or sometimes truncate, base attenuate, 22–40 × 14–22 μ; epispore smooth, 2–2.5 μ thick, thickened at the apex (up to 8 μ); germ-pore apical, conspicuous; pedicel hyaline or tinted, persistent up to 120 × 12 μ.

Uromyces Polygoni. Teleutospores.

Hosts: Polygonum aviculare L., Standerton, 18.3.04, [178]; Marico District, November, 1907 [433]; Ventersdorp, 13.11.08 [542]; Sterkwater, Pretoria District, 16.11.11, Pienaar [1960]; Flaaukraal, Woodhouse District, Cape Province, 14.1.12, Pienaar [2003].

Polygonum tomentosum Willd., Natal, August, 1881, Medley Wood [825]; Garstfontein, Pretoria District, 14.5.13, Pienaar [6654].

Distribution: Africa, Europe, North America, Asia, Australia, New Zealand.

Aecidia have not been collected in South Africa.

35. **Uromyces Rumicis** (Schum.) Wint.

in Pilze Deutschl. 1884, p. 145; Syd. Monogr. Ured. II, p. 238.

Syn. *Uredo Rumicis* Schum. Pl. Saell. II, p. 231 (1803).

For complete synonymy, see Syd. loc. cit.

II. Uredo-sori amphigenous, on leaf spots, small, round, soon becoming naked, pulverulent, cinnamon-brown. Uredospores sub-globose or ellipsoid, light brown, 20–28 × 18–24 μ; epispore echinulate, with 2–3 germ-pores.

III. Teleuto-sori, similar but darker in colour. Teleutospores sub-globose, ellipsoid, ovate or pyriform, with a hyaline, sub-globose, apical papilla, often attenuate at the base, 24–35 × 18–24 μ; epispore rather thick, smooth or nearly so; pedicel delicate, hyaline, deciduous.

Hosts: Rumex Woodii N.E. Br. Kokstad, 7.4.18. Mogg [14147].
Rumex crispus Somerset East, Cape Province, 16.3.12, Pienaar [2233].

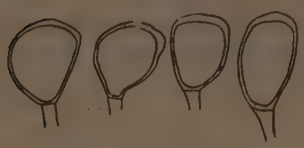
Distribution: South and East Africa, Europe, California, Chile.

Species parasitic on **Iridaceae.**

Antholyza L.

36. **Uromyces kentanienis** n. sp.

III. Teleuto-sori amphigenous, but mostly hypophyllous, about 0·5 mm. broad and up to 2 mm. long, occasionally becoming confluent and forming long series, light brown, with closely set black punctiform dots, remaining indefinitely covered by the epidermis, very compact. Teleutospores crowded in small groups (usually not more than 100 μ in diameter) separated by groups of light brown, palisade-like paraphyses. Spores ovate, ovate-ellipsoid or broadly cuneate, rounded, truncate or obtusely attenuate at the apex, attenuate or more rarely rounded at the base, light brown, but much darker at the apex, 23–34 × 18–27 μ; epispore smooth, thin at the base (about 1 μ) and becoming gradually thicker towards the apex, usually 1·5–2 μ thick at the sides and 4 μ (rarely 5 μ) thick at the apex; germ pore obscure; contents granular; pedicel hyaline or slightly tinted, persistent, up to 30 μ long. Paraphyses light brown, firmly agglutinated by their lateral walls, up to 50 μ long and about 6 μ thick.



Uromyces kentanienis.
Teleutospores.

Host: Antholyza aethiopica L., Kentani, Cape Province, 29.12.15, Pegler 2381 [9313].

Distribution: Cape Province.

Differs from U. Antholyzae, described by Sydow from Abyssinia ((Monogr. Ured. II, p. 252) in the presence of paraphyses and the broader spores with less strongly thickened apices. It more closely resembles U. transversalis from which it differs in the broader spores and less strongly thickened apex. Antholyza is an African genus of 41 species, of which 21 species are South African.

Acidanthera Scheidw.

cfr. Ixia, Tritonia.

Babiana Ker.

37. **Uromyces Babianae** n. sp. =

III. Teleuto-sori amphigenous, black, oblong, minute, single sori about 0·5 mm. long, but often becoming confluent and forming lines several mm. long, soon becoming naked, surrounded by the torn epidermis, rather compact not pulverulent. Teleutospores brown, sub-globose, oblong, ellipsoid or ovate, sometimes shorter than broad, apex usually rounded, base rounded or sub-attenuate, 20–30 × 16–27 μ; epispore smooth, 2.5–3.5 μ thick, barely thickened (up to 6 μ); pedicel persistent, very light brown, darker near apex, about 5 μ thick and up to 50 μ long.

Uromyces Babianae.
Teleutospores.

Host: Babiana disticha Ker., Retreat, Cape Province, 2.2.19, Pole Evans [12959]

Distribution: Cape Province.

Of the thirty-four known species of Babiana, thirty-two are South African.

Dierama C. Koch.

38. **Uromyces Sparaxidis** Syd.

in Ann. Myc. II, p. 27; Monogr. Ured. II, p. 2557.

II. Uredo-sori amphigenous, scattered, minute, punctiform, yellow. Uredospores yellow, sub-globose, ellipsoid or ovate, 15–17 × 13–20 μ; epispore hyaline, about 1·5 μ thick, delicately verruculose, and with several small scattered germ pores.

III. Teleuto-sori amphigenous, scattered or in small groups, round or oblong, scarcely 0·25 mm. long, long covered by the epidermis, rather compact, dark brown. Teleutospores chestnut-brown, mostly ovate or sub-cuneate, often angular, apex truncate, rounded or somewhat acute, base usually attenuate, 19–28 × 14–20 μ; epispore thin, about 1·5 μ, smooth, thickened at the apex (4–8 μ); pedicel light brown, persistent up to 30 μ long.

Uromyces Sparaxidis.
Teleutospores.

Hosts: Dierama pendula Baker, Inanda, Natal, June, 1881, Medley Wood 585 [10475]; Cramond, Natal, 11.4.11, 6.11.12, and 3.6.12, Pole Evans [14-1, 1580, and 2410].

Dierama pulcherrima Baker, Kentani, Cape Province, 21.5.13 and 12.12.13, Pegler [6677 and 7092]; 20.8.13, Pegler [6924].

Distribution: South Africa.

It would appear that there was some error in the determination of the host of the type which is given as Sparaxis lineata. Unfortunately Sydow, in his original description does not quote Medley Wood's number, but the only collection of Wood's in the National Herbarium is the one quoted above, which is on Dierama (= Sparaxis pendula). No species of the genus Sparaxis proper are known to occur in Natal. Dierama is an African genus of three species, two of these are South African.

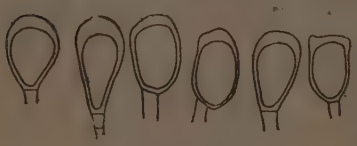
Freesia Klatt.

39. **Uromyces Ecklonii** Bubak.

in Sydow. Monogr. Ured. II, p. 253.

II. Uredo-sori amphigenous, round or irregular, scattered or becoming crowded and confluent and then up to 1 mm. long, surrounded by the torn epidermis which splits transversely, yellow-brown. Uredospores sub-globose or ovate, rarely ellipsoid, yellow, 15–23 × 13–17 μ; epispore hyaline 1·5 μ thick, minutely and closely verruculose; germ pores obscure, but so far as could be observed, numerous, small, scattered. No paraphyses present.

III. Teleuto-sori, similar to the uredo-sori, but dark brown, and rather compact. Teleutospores ovate, ellipsoid or pyriform, often angular, apex rounded, truncate or more rarely conical, base attenuate or rounded, brown, 22–32 × 16–24 μ; epispore smooth 2–2·5 μ thick, thickened at the apex (up to 10 μ); pedicel persistent, hyaline, slightly coloured at the apex, up to 40 μ long.



Uromyces Ecklonii. Teleutospores.

Host: Freesia refracta Klatt, Prospect, near Komgha, Cape Province, 24.8.12, Pegler [5129].

Distribution: Cape Province.

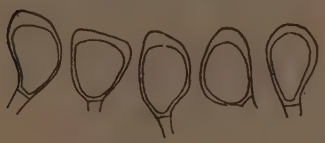
Freesia is an endemic genus of two species, but these are now under cultivation in many countries.

40. **Uromyces Freesiae** Bubak.

in Oesterr. Botan. Zeitschr. L, 1900, p. 318; Syd. Monogr. Ured. II, p. 252.

II. Uredo-sori amphigenous, on brown leaf-spots, scattered, minute, round or elliptic, surrounded by the torn epidermis, light brown. Uredospores sub-globose, ovate or ellipsoid, yellow, 19–24 × 13–22 μ; epispore hyaline, about 1·5 μ thick, densely and minutely verruculose; germ pores obscure, but so far as could be observed, numerous, small, and scattered. Paraphyses mingled with the uredospores, hyaline, clavate, about 40 μ long and 9–16 μ thick.

III. Teleuto-sori amphigenous, on brown leaf-spots, scattered, round to ellipsoid, long, covered by the blackened epidermis, which finally splits in a direction transverse to the leaf axis. Teleutospores sub-globose, ovate or ellipsoid, more rarely clavate, often angular, brown, apex rounded, truncate, or conical, base rounded or attenuate, 20–34 × 13–22 μ; epispore smoooth, 2–2·5 μ thick, thickened at the apex (up to 7 μ); pedicel sub-persistent, hyaline, up to 40 μ long.



Uromyces Freesiae. Teleutospores.

Host: Freesia refracta Klatt., Johannesburg, 3.8.23, [17283.]

Distribution: South Africa.

Differs from U. Ecklonii in the presence of paraphyses.

Geissorhiza Ker.

41. **Uromyces Geissorhizae** P. Henn. = U. [illegible]

in Hedwigia XXXIX, 1900 (153); Syd. Monogr. Ured. II, p. 253.

II. Uredo-sori amphigenous, scattered, minute, yellow-brown; uredospores globose or sub-globose, more rarely ellipsoid, hyaline or yellowish, 17–22 μ diam.; epispore minutely verruculose, 2 μ thick.

III. Teleuto-sori amphigenous, scattered, elliptic or oblong, often striiform, 0·3–1 mm. long, long covered by the lead-coloured epidermis, rather compact, black. Teleutospores sub-globose, ellipsoid or ovate, usually rounded at the apex, brown, 22–32 × 18–28 μ, epispore smooth, 2·5 μ thick, thickened at the apex (4–9 μ); pedicel brown, rather thick, up to 70 μ long.

Hosts: Geissorhiza rupestris, G. secunda and Moraea ramosa.

Distribution: South Africa.

Not represented in the National Herbarium, but recorded by Sydow (*loc. cit.*) on the hosts mentioned above from South Africa.

Gladiolus L.

42. **Uromyces Gladioli** P. Henn.

in Hedwigia XXXIV, 1895, p. 326; Syd. Monogr. Ured. II, p. 254.

II. Uredo-sori amphigenous, scattered or becoming crowded, minute, round or oblong (not transverse), often confluent, yellow, the epidermis splitting from the centre and exposing most of the sorus. Uredospores globose, sub-globose or ovate, yellow, 15–22 × 14–20 μ; epispore hyaline, 2·5 μ thick, minutely verruculose, with several small, scattered germ pores.

III. Teleuto-sori amphigenous, irregularly scattered or grouped, round or oblong, often irregular, long covered by the epidermis, rather compact, dark brown to black. Teleutospores brown, sub-globose, ellipsoid or ovate, apex usually rounded, more rarely truncate or somewhat conical, base rounded or attenuate, 20–37 × 18–28 μ; epispore smooth, 2–3 μ thick, thickened at the apex (5–10 μ); pedicel persistent, brown, up to 75 μ long. No paraphyses present.

Uromyces Gladioli. Teleutospores.

Hosts: Gladiolus cuspidatus Jacq., Diep River, Cape Province, December, 1915, Marloth [9304].

Gladiolus formosus Klatt, Bokkeveld, December, 1916, Marloth 7561 [10032].

Gladiolus spp., Capetown, 14.11.08 [543]; Belfast, Transvaal, February, 1909, Doidge [563]; Durban, December, 1915, van der Bijl [9176]; Belfast, Transvaal, 24.2.17, Pole Evans [10987].

Distribution: South and Tropical Africa.

43. **Uromyces transversalis** (Thuem.) Wint.

in Flora XLII, 1884, p. 263; Syd. Monogr. Ured. II, p. 257.

Syn. *Uredo transversalis* Thuem. in Flora, 1876, p. 570.

II. Uredo-sori amphigenous, scattered or in groups, about 0·3–1·5 mm. long, round or transversely oblong, long covered by the epidermis, yellow-brown. Uredospores yellow, globose, ovate, ellipsoid or oblong, 14–26 × 13–19 μ; epispore hyaline, 1·5–2·5 μ thick, minutely verruculose, and with 6–8 small scattered germ pores.

III. Teleuto-sori similar, but rather compact, smaller, black. Teleutospores separated into groups by bunches of palisade like paraphyses, which are yellow-brown and closely packed together. Spores ovate, ellipsoid or pyriform, more rarely sub-globose, light brown, darker at the apex, apex rounded, truncate, or conically attenuate, base attenuate or rounded, 20–34 × 14–21 μ; epispore smooth, 1·5–2 μ thick, thickened at the apex (4–8 μ); pedicel hyaline, or tinted at the apex, slender, up to 45 μ long.

Uromyces transversalis. Teleutospores.

Hosts: Gladiolus psittacinus Hook., Sydenham, Natal, 1884, Medley Wood [360].

Gladiolus recurvus L., Albertinia, Cape Province, September, 1914, Muir [8867].

Gladiolus spp., Natal, 1884, Medley Wood 591 and 698 [10598, 10597, 11225]; Arcadia, Pretoria, 17.5.08 [472]; Garstfontein, Pretoria District, 25.3.11, Pienaar [1258]; Paardeplaats, Lydenburg District, 2.5.11, Pienaar [1503]; Cramond, Natal, 12.2.13, Pole Evans [6851]; Mooi River, Natal, 21.3.17, Mogg [10077]; Kaalfontein, Transvaal, May, 1917, Pole Evans [10134]; Rosetta, Natal, Mogg [11635 and 14145]; Entumeni, Zululand, June, 1916, Haygarth [14176 and 14181]; Mooi River, 14.4.19, Mogg [17037]; Silverton Road, Pretoria, 8.5.25, Doidge [20418].

Montbretia securigera Ker., near Somerset East, Cape Province, MacOwan (Rabh. Fung. Eur. 3014) [3355].

Tritonia lineata Ker., Capetown, November, 1890, MacOwan (Rabh. Fung. Eur. 3724) [4064].

Tritonia spp., Natal, Medley Wood 458 [10596]; Kentani, Cape Province, 19.8.17, Pegler 2435, [10992].

Distribution: South Africa.

Differs from U. Gladioli chiefly in the presence of paraphyses in the teleuto-sori.

Unfortunately in the majority of the above collections the species of the host cannot be determined, as it has been collected after the flowering period was past.

Ixia L.

44. **Uromyces Ixiae** (Lev.) Wint.

in Flora XLII, 1884, p. 262; Syd. Monogr. Ured. II, p. 255.

II. Uredo-sori amphigenous, scattered or becoming crowded, minute, round or oblong, yellow, long veiled by the epidermis. Uredospores globose, sub-globose or ovate, yellow, 17–24 × 15–20 μ; epispore 3–3·5 μ thick, minutely verruculose, and with 6–8 indistinct germ pores.

III. Teleuto-sori similar to the uredo-sori, but black. Teleutospores globose, sub-globose, ellipsoid or ovate, apex rounded, truncate or even conico-attenuate, brown, 23–36 × 16–28 μ; epispore smooth, 2–3 μ thick, thickened at the apex (4–8 μ); pedicel rather thick, yellow or brownish, up to 60 μ long.

Hosts: Ixia coerulescens, I. erecta, I. paniculata, I. patens, I. polystachya, Acidanthera exscapa, and Sparaxis grandiflora.

Distribution: South Africa.

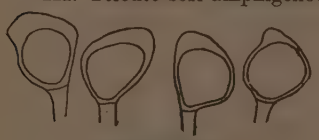
The above hosts are recorded by Sydow in his Monograph, without locality. I have not seen this species.

45. **Uromyces Zeyheri** Bubak.

in Syd. Monogr. Ured. II, p. 255.

II. Uredospores mixed with the teleutospores, globose, sub-globose, ovate or oblong, yellow, 20–27 × 20–24 μ; epispore hyaline, about 2 μ thick, very briefly echinulate, and with 6–8 scattered germ pores.

III. Teleuto-sori amphigenous, scattered or in groups, round or oblong and transverse and becoming confluent, black, compact, long covered by the epidermis. Teleutospores globose, ovate or ellipsoid, rounded at the apex or less frequently truncate or attenuate, attenuate or rounded at the base, brown, 25–35 × 20–30 μ; epispore smooth, 3–3·5 μ thick, thickened at the apex (6–9 μ); pedicel persistent, yellow or brownish, rather thick, up to 70 μ long.



Uromyces Zeyheri. Teleutospores.

Host: Ixia maculata L., St. James, Cape Province, 25.12.13, Pole Evans [7786].

Distribution: South Africa.

Originally described on Ixia scillaris, collected by Schlechter in the Houwhoekberg, Sydow states that this species differs from U. Ixiae chiefly in the larger uredospores. I have not seen the latter species.

Lapeyrousia Pourr.

46. **Uromyces Anomathecae** Cke.

in Grevillea XIX, 1890, p. 6.; Syd. Monogr. Ured. II, p. 256; Ann. Myc. XX (1922), p. 54.

II. Uredo-sori amphigenous, minute, round or oblong, yellow, long remaining covered by the epidermis. Spores sub-globose, ovate or ellipsoid, yellow, 20–24 × 13–20 μ; epispore hyaline, about 2 μ thick, very delicately echinulate, germ pores small, obscure, numerous, scattered.

III. Teleuto-sori greyish-brown, amphigenous, scattered, on small brown leaf-spots, which are elongated in a direction transverse to the leaf axis, sori minute, round or oblong, sub-transverse, and up to 0·5 mm. long, long covered by the white blistered epidermis, which finally splits transversely. Teleutospores in groups separated by bunches of brown palisade-like paraphyses, oblong, ovate, cuneate or irregular, and angular in outline, brown, truncate, rounded or conical at the apex, attenuate or rounded at the base, 25–35 × 16–24 μ; epispore smooth, about 2 μ thick, thickened at the apex (up to 7 μ); pedicel light brown, persistent, about 5 μ thick and up to 45 μ long.

Uromyces Anomathecae. Teleutospores.

Hosts: Lapeyrousia (Anomatheca) cruenta Baker, Durban, Natal, 18.2.87, Medley Wood 693 [330]; Winkle Spruit, Natal, 6.7.12, Doidge [2507].

Lapeyrousia grandiflora Baker, Wonderboom, Pretoria District, 19.1.08, Pole Evans [443].

Distribution: South Africa.

The hosts are indigenous: Lapeyrousia is an African genus of fifty species, of which thirty-six occur in South Africa.

47. **Uromyces delagoensis** Bubak.

in Syd. Monogr. Ured. II, p. 255.

II. Uredo-sori amphigenous, scattered, very minute, round or oblong, yellow. Uredospores globose, sub-globose, ovate or ellipsoid, yellow, 18–25 × 17–22 μ; epispore 2–2·5 μ thick, delicately echinulate, and with 8 germ pores.

III. Teleuto-sori similar to the uredo-sori, but black. Teleutospores brown, globose, ovate or pyriform (more rarely ellipsoid), often angular, apex round, truncate or conical, brown, 26–38 × 20–28 μ; epispore smooth, about 2 μ thick, thickened at the apex (4–9 μ) or scarcely thickened; pedicel hyaline or very light brown, up to 45 μ long.

Host: Lapeyrousia delagoensis Baker, Mozambique, Portuguese East Africa, Junod.

Distribution: Portuguese East Africa.

This species is not represented in the Nat. Herb., and I have not seen the type. It seems highly probable, however, that it is identical with U. Anomathecae: the descriptions show no important points of difference.

Melasphaerula Ker.

48. **Uromyces Melasphaerulae** Syd.

in Ann. Myc. II (1904) p. 28; Monogr. Ured. II, p. 256.

II. Uredo-sori amphigenous, on round or irregular brown leaf-spots, which are often indistinct, scattered, minute, punctiform, round, light yellow-brown or yellow. Uredospores globose, sub-globose or ellipsoid, yellow, 19–25 × 16–22 μ; epispore 2–2·5 μ thick, minutely verruculose.

III. Teleuto-sori similar, long covered by the epidermis, dark greyish-brown

Teleutospores regularly globose or sub-globose, apex always rounded, brown 22-26 × 19-24 μ; epispore smooth, about 2 μ thick, thickened at the apex (3–6 μ); pedicel brown, up to 30 μ long.

Host: Melasphaerula graminea Ker, Hopefield, Cape Province (Bachmann).

Distribution: South Africa.

This species is not represented in the National Herbarium, the description being taken from the original. It is characterised by the quite regularly spherical teleutospores. Melasphaerula is an endemic, monotypic gunus.

Montbretia D.C.

cfr. Gladiolus.

Moraea L.

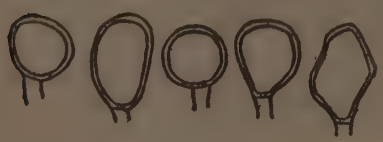
cfr. also Geissorhiza.

49. **Uromyces Moraeae** Syd.

in Ann. Myc. X (1912), p. 33; Sacc. Syll. Fung. XXIII, p. 648.

II. Uredo-sori amphigenous, scattered, minute, oblong, yellow-brown. Uredospores globose, sub-globose or ellipsoid, yellow, 21–26 × 14–21 μ; epispore hyaline, 1·5 μ thick, minutely verruculose-echinulate.

III. Teleuto-sori amphigenous, scattered, elliptic or oblong, up to 2 mm. long, long covered by the torn epidermis, rather compact, black. Teleutospores sub-globose, ovate or ellipsoid, apex rounded, base rounded, rarely attenuate, brown, 18–28 × 16–24 μ; epispore smooth, 2–2·5 μ thick, slightly thickened at the apex (2–4 μ, rarely up to 6 μ); pedicel hyaline, slightly tinted at the apex, rather thick, persistent, up to 50 μ long.



Uromyces Moraeae.
Teleutospores.

Host: Moraea spathacea Ker., Volksrust, Transvaal, 28.4.09, Weeber [773]; Melmoth, Zululand, 6.4.18, Foster [11630]; Mooi River, Natal, 14.4.19, Mogg [17036].

Distribution: South Africa.

The genus Moraea has representatives in Africa, Madagascar, and Australia: of the ninety known species, sixty-one are South African.

Romulea Maratti.

50. **Uromyces Romuleae** n. sp. [illegible]

III. Teleuto-sori amphigenous, black, elliptic, 0·5–0·75 mm. broad and up to 4 mm. long, soon becoming naked, surrounded by the torn epidermis, rather compact, usually on either side of the midrib. Teleutospores brown, irregular in shape, often angular, ellipsoid, oblong, ovate or sub-globose, apex rounded, truncate or conically attenuate, often oblique, base attenuate or sub-rounded, 22–35 × 16–27 μ; epispore smooth, about 2 μ thick, thickened at the apex, 5–10 μ; pedicel very light brown, slightly darker at the apex, persistent, 5–7 μ thick and up to 60 μ long.

Uromyces Romuleae.
Teleutospores.

Host: Romulea rosea Ecklon., Klapmuts, Cape Province, 31.12.16, van der Bijl, [10094].

Sparaxis Ker.

cfr. Ixia.

Tritonia Ker.

cfr. also Gladiolus.

51. **Uromyces bonae-spei** Bubak. = U. Zeyheri p.p. ...

in Syd. Monogr. Ured. II, p. 258.

II. Uredo-sori amphigenous, scattered or in groups, round or irregular in shape, often transversely oblong and confluent, opening irregularly, yellow, pulverulent. Uredospores globose, sub-globose or ovate, yellow, 20–27 × 15–22 μ; epispore 2 μ thick, very briefly echinulate.

III. Teleuto-sori similar to the uredo-sori, but compact, black. Teleutospores globose, ovate, pyriform or ellipsoid, apex rounded, truncate or conico-attenuate, chestnut-brown, 24–36 × 19–27 μ; epispore smooth, 2–3 μ thick, thickened (5–10 μ) at the apex; pedicel persistent, brownish, rather thick, up to 50 μ long.

Hosts: Tritonia scillaris Baker and Acidanthera pallida.

Distribution; South Africa.

I have not seen this species. Tritonia is an African genus of fifty-five species, of which forty-one occur in South Africa.

Watsonia Mill.

52. **Uromyces Watsoniae** Syd.

in Monogr. Ured. II, p. 258.

II. Uredo-sori amphigenous, on round or oval, brown leaf-spots, scattered or becoming crowded, minute, oblong, light brown, long covered by the epidermis. Uredospores sub-globose, ellipsoid or ovate, yellow, 18–27 × 13–20 μ; epispore hyaline, 1·5–2 μ thick, very briefly echinulate and with several indistinct scattered germ pores.

III. Teleuto-sori amphigenous, scattered or in groups, minute, mostly round or elliptic, 0·25–0·5 mm. long, long covered by the epidermis, compact, black. Teleutospores rather variable in shape, mostly ovate or ellipsoid, often angular, apex rounded, yellow-brown, 19–30 × 14–20 μ; epispore smooth, thin, about 1 μ thick, more or less thickened at the apex (4–7 μ); pedicel brown, delicate, persistent, up to 50 μ long. Teleutospores separated into groups by yellow-brown paraphyses, which are palisade-like and densely packed.

Uromyces Watsoniae. Teleutospores.

Host: Watsonia densiflora Baker, Belfast, Transvaal, Feb., 09, Doidge [552].
Watsonia angusta Ker., Kentani, Cape Province, 5.12.15 and 21.12.15, Pegler 2360 and 2379 [9165 and 9192].

Distribution: South Africa.

The paraphyses resemble those of U. transversalis, from which U. Watsoniae differs in the thin epispore of the teleutospores.

Watsonia is, with the exception of one species found in Madagascar, entirely a South African genus; but it has been brought into cultivation elsewhere.

Species parasitic on the **Amaryllidaceae.**

53. **Uromyces badius** Syd.

in Ann. Myc. 22 (1924), p. 235.

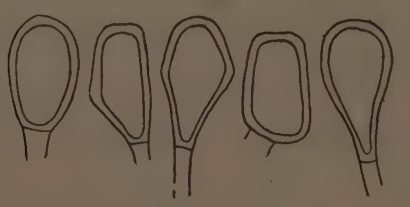
O. Spermogones not seen.

I. Aecidia on elongated yellowish leaf-spots, which are 1–2 cm. long and visible on both leaf surfaces, amphigenous, in ellipsoid or oblong groups, yellow, cupulate, 300–500 μ

diam.; peridium white, with a reflexed and incised margin; cells of the peridium firmly joined together, oblong to polygonal, 27–40 × 15–25 μ, outer wall striate, 8–10 μ thick, inner verruculose, 3–4 μ thick. Spores angular-globose to ellipsoid, 20–30 × 20–24 μ, wall hyaline, about 1·5 μ thick, very minutely and closely verruculose.

II. Uredo-sori on yellowish white leaf-spots, which are visible on both leaf surfaces, at first round, 3–6 mm. long, but soon becoming confluent and measuring several centimetres. Uredo-sori amphigenous, scattered or in groups, surrounded or partly veiled by the ruptured epidermis, yellow-brown, up to 1 mm. diam., pulverulent. Uredospores globose, sub-globose, or broadly ellipsoid, 25–34 × 24–28 μ; epispore hyaline, about 1·5–2 μ thick, briefly verruculose-echinulate, with about 10 scattered germ pores.

III. Teleuto-sori similar to the uredo-sori, but for a long time covered by the lead-coloured epidermis and dark brown to black. Teleutospores ovate, oblong or clavate, often angular, rounded or truncate at the apex, rounded or attenuate at the base, golden-brown, 26–45 × 20–26 μ; epispore smooth, 2–3·5 μ thick, not thickened at the apex; pedicel persistent, hyaline or slightly tinted, 15–30 μ long.



Uromyces badius.
Teleutospores.

Host: Haemanthus coccineus L., Capetown, lower slopes of Table Mt., July, 1917, Wordsworth [10996]; between Table Mt. and Devil's Peak, 9.11.14, Andreae [20309].

Distribution: Cape Province.

This species was originally described from material collected by Miss Duthie at Stellenbosch (van der Bijl 1254).

On the leaves of No. 10996, quoted above, the aecidia, the uredo-, the teleuto-sori occur simultaneously, all three stages being found on one leaf, of which both surfaces are almost entirely covered with pustules. The aecidia were very old.

54. **Uromyces Hypoxidis** Cke.

in Grevillea X, 1881, p. 127; Syd. Monogr. Ured. II, p. 274.

II. Uredo-sori amphigenous on undeterminate leaf-spots, which are brown or purplish-black according to the species of the host, scattered or in small groups, round, minute, long covered by the epidermis. Uredospores ellipsoid or sub-globose, yellow brown, 22–28 × 19–25 μ; epispore about 1·5 μ thick, minutely verruculose-echinulate and with 4–6 small scattered germ pores.

III. Teleutospores rare, only a few being found mixed with the uredospores, ellipsoid or ellipsoid-pyriform, light yellow-brown, 27–35 × 19–24 μ; epispore smooth, 1·5–2 μ thick, not thickened at the apex; pedicel short, thick, light brown.

Uromyces Hypoxidis.
Teleutospores.

Hosts: Hypoxis oligotricha Baker, Clairmont, Natal, May, 1881, Medley Wood 586 [789, 11122 and 11170].

Hypoxis villosa L. fil., Kentani, Cape Province, 17.2.15 and 15.11.15, Pegler 1985 [8935].

Hypoxis latifolia Hk. (II only), Winkle Spruit, Natal, 2.7.11, Pole Evans [1597].

Distribution: Natal and Transkei.

Of the eighty-eight species known, belonging to the genus Hypoxis, the majority are African; there are forty-one species in South Africa, two species in the Malay Archipelago, Japan, and Formosa, and three species in North and South America.

Species parasitic on **Liliaceae.**

Albuca L.

55. **Uromyces Albucae** Kalch. et Cke.

in Grevillea XI, 1882, p. 20; Syd. Monogr. Ured. II, p. 260.

Syn. *Uredo sempertecta* Thuem. in Flora, 1878, No. 60.

II. Uredo-sori amphigenous, scattered, oblong, minute, about 1 mm. long, the larger ones up to 4 mm. long, long covered by the epidermis, which finally slits longitudinally, cinnamon-brown. Uredospores ovate or broadly ellipsoid, less frequently sub-globose, pale yellow-brown, 20–36 × 16–21 μ; epispore yellowish, 1·5–2 μ thick, finely echinulate, and with numerous (8–10) small scattered germ pores.

III. Teleuto-sori amphigenous, oblong, similar to the uredo-sori, covered by the epidermis, dark brown. Teleutospores oblong, ellipsoid or sub-globose, often angular, apex rounded, truncate or sub-acute, base usually rounded, brown, 19–34 × 14–24 μ; epispore smooth, 1·5–2 μ thick, not thickened at the apex; pedicel persistent, hyaline, with a brown apex, up to 54 μ long, usually about 30 μ. Isolated 2-celled teleutospores are occasionally seen.

Uromyces Albucae.
Telcutospores.

Hosts: Albuca spp., Inanda, Natal, Medley Wood 68 and 647 [11129, 11130 and 11165]; Kirstenbosch, Cape Province, August, 1914, Glover [8368]; same locality, 2.10.14, Pearson [8395 and 8408].

Distribution: South and tropical Africa.

Has been recorded (Syd. *loc. cit.*) on Albuca altissima, A. aurea, A. juncifolia, and A. minor from South Africa and Angola. The genus Albuca is mainly African, with sixty-nine South African species.

Aloe L.

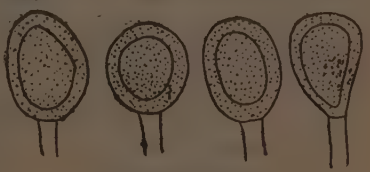
56. **Uromyces Aloës** (Cke.) P. Magn.

in Ber. Deutsch. Bot. Gesellsch. X, 1892, p. 48; Syd. Monogr. Ured. II, p. 265.

Syn. *Uredo Aloës* Cke. in Grevillea XX, p. 16 (Sept., 1891).

Uromyces aloicola P. Henn. in Engl. Bot. Jahrb. XIV, p. 370 (Dec., 1891).

III. Teleuto-sori amphigenous, developing centrifugally in large circular groups up to 3 cm. in diameter, usually arranged in circles, single sori round to oblong, 1–2 mm. long, soon becoming confluent, long covered by the greyish blistered epidermis, dark brown, subpulverulent. Teleutospores brown, sub-globose, ovate or ellipsoid, often irregular in shape, usually rounded at base and apex, 30–55 × 20–35 μ; epispore smooth, irregular in thickness (4–7 μ), but not thickened at the apex, punctate, verruculose; pedicel hyaline, sub-persistent, up to 130 μ long.



Uromyces Aloes.
Teleutospores.

Hosts: Aloe Davyi, Potgietersrust, Transvaal, 19.4.06, Pole Evans [117].

Aloe ferox Mill., Port Elizabeth, Cape Province, 29.3.12, Doidge [2327].

Aloe grandidentata Salmdyck., Johannesburg, Transvaal, 18.10.22, Knox-Davies [15532].

Aloe latifolia Haw., East London, Cape Province, 13.11.16, Rattray [9826].

Aloe saponaria Haw., Mooi River, Natal, April, 1891, Medley Wood [325].

Aloe Thraskii Baker, Pretoria, Transvaal, 1.5.15, Pole Evans [8973].

Aloe transvaalensis Schon., Groenkloof, Pretoria District, 27.8.11, Burtt Davy [1868]; same locality, Jan. 1915, and November, 1910, Pole Evans [8922 and 1007].

Aloe spp. undet., Barberton, 29.8.11, Pole Evans [1924]; Pretoria, 4.3.15, Bottomley [8900]; Natal, July, 1923 [17278].

Distribution: South Africa, Abyssinia, East India.

In addition to the above hosts, Uromyces Aloes has been recorded on Aloe Baumii and A. maculata from Africa and from A. spicata from East India. It is an extremely common rust on many species of Aloe, so common that it is often passed over by the collector and that a collection representative of all hosts has not been made. In the garden of the Division of Botany, Pretoria, it is particularly severe on Aloe striata and interferes considerably with the cultivation of this very ornamental species.

The genus Aloe is largely African—ninety species are known in South Africa—and extends to Madagascar, Socotra, India, China, Arabia, and the Mediterranean region.

Bulbine L.

57. **Uromyces Bulbinis** Theum.

in Flora LX, 1877, p. 410; Syd. Monogr. Ured. II, p. 267.

III. Teleuto-sori amphigenous on large yellow leaf-spots about 1 cm. in diameter, developing centrifugally in concentric zones, and thus forming irregular to round groups about 1 cm. in diameter, these sometimes coalesce and form larger irregular groups; individual sori minute, round to oblong, closely crowded, but rarely confluent, 0·3–0·5 mm. long, long remaining covered by the epidermis, which finally slits longitudinally and still partially veils the spores, rather compact, brown. Teleutospores light brown, ellipsoid, clavate or ovate, more rarely sub-globose, apex usually rounded, more rarely truncate or sub-acute, base rounded or attenuate, 25–40 × 20–28 μ; epispore smooth, 3–4 μ thick, usually slightly thickened at the apex (up to 7 μ); pedicel sub-persistent, hyaline, slender, up to 50 μ long.

Uromyces Bulbinis.
Teleutospores.

Hosts: Bulbine aloides L., Boschberg Mountains, Cape Province, November, 1873, MacOwan 1019 [20784].

Bulbine latifolia R. and S., Natal, Medley Wood 451 [11128 and 11175].

Distribution: South Africa.

Bulbine is mainly a South African genus, but two species occur in Australia and several in tropical Africa.

A Uromyces has been recorded in Australia on Bulbine bulbosa which Cooke (Handb. Austral Fung., p. 709) refers to U. Bulbinis. Sydow (*loc. cit.*) states that he considers it questionable whether the Australian fungus belongs to this species, and a comparison of MacOwan's and Wood's material with Australian material collected by Samuel, leads one to confirm this view. The differences both macroscopic and microscopic, are such as to justify the description of the latter as a distinct species.

Uromyces bulbinicola sp. nov.

III. Teluto-sori hypophyllous and caulicolous, in groups which on the leaves show signs of centrifugal development in elliptic groups, single sori elliptic, up to 2·5 mm. long, often becoming confluent, soon becoming naked and surrounded by the torn white epidermis, or (on the stem) remaining partially veiled, brown, pulverulent. Teleutospores flattened-globose or ellipsoid, rarely clavate, often irregular or angular, golden-brown, apex rounded or truncate, rounded, rarely attenuate at the base, 15–24 × 15–24 μ; epispore smooth, 3–4 μ thick, somewhat uneven in thickness, but not noticeably thickened at the apex; pedicel persistent, hyaline, slender, up to 20 μ long.

Uromyces bulbinicola.
Teleutospores.

Host: Bulbine bulbosa Haw., National Park, Belair, South Australia, November, 1922, Samuel [18171].

Eriospermum Jacq.

58. **Uromyces Eriospermi** Kalch. et Cke.

in Grevillea XI, 1882, p. 21; Syd. Monogr. Ured. II, p. 268.

Syn. *Aecidium Eriospermi* P. Henn. in Engl. Bot. Jahrb. XXIII, 1897, p. 542; Syd. Monogr. Ured. IV., p. 360.

Uredo Eriospermi MacOwan in herb.

O. Spermogones not seen.

I. Aecidia amphigenous, irregularly grouped or scattered, pale yellow, 250–300 μ diam. Peridia cupulate, white, slightly recurved and incised at the margin; cells of the peridium firmly joined together, rhomboid 23–27 × 14–20 μ, outer wall smooth, 6–7 μ thick, inner wall about 5 μ thick, verruculose punctate. Aecidiospores angular globose, 19–25 μ diam., wall hyaline, very thin (less than 1 μ), delicately verruculose, contents yellow.

II. Uredo-sori often on the same leaves as the aecidia, amphigenous, mostly hypophyllous, scattered, usually minute, round to irregular, surrounded by the torn epidermis, pulverulent, cinnamon-brown. Uredo-spores sub-globose or ellipsoid, pale yellow, 18–27 × 16–25 μ; epispore pale yellow, 2–2·5 μ thick, verruculose-echinulate, and with 3, slightly papillate equatorial germ pores.

III. Teleuto-sori amphigenous, scattered or in groups and often intermingled with the uredo-sori; single sori minute, 0·5–1 mm. long, round or elliptic, often by confluence producing composite sori of irregular outline and up to 8 mm. diameter, long covered by the epidermis, pulverulent, dark brown to black. Teleutospores chestnut brown, sub-globose, globose, ovate or pyriform, apex rounded, base rounded or more rarely attenuate, 23–37 × 17–27 μ; epispore smooth, about 3 μ thick, slightly thickened at the apex (5–8 μ); pedicel hyaline, brown at the apex, persistent, 30–45 μ long.

Uromyces Eriospermi.
Teleutospores.

Hosts: Eriospermum cernuum Baker, Table Mountain, Kasteelpoort Slope, August, 1923, Marloth [17282].

E. dissitiflorum Schltr., Belfast, Transvaal, February, 1909, Doidge [566]; Belfast, 29.12.06, Ingle [251].

E. latifolia Schult., Somerset East, Cape Province, MacOwan [1019].

E. Mackenii Baker, Umzinyati, Natal, March, 1881, Medley Wood 552 [11172 and 11126].

Eriospermum spp., Capetown, 15.8.08., Saxton [502]; Belfast, Transvaal, November, 1909, Doidge [763]; Kaalfontein, Transvaal, Mogg [11653]; Alicedale, Cape Province, May, 1919, Cruden [12181]; Ceres, Cape Province, 20.9.24, Marloth [19871]; Cedara, Natal, 15.12.14, Staples [20305].

Distribution: South Africa.

Eriospermum is an African genus of over sixty species, of which forty-five are South African.

Lachenalia Jacq.

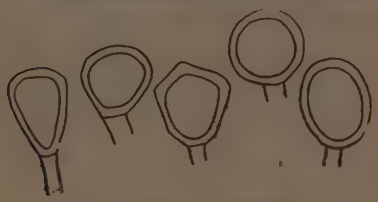
59. **Uromyces Lachenaliae** n. sp.

O. Spermogones minute, amphigenous, honey-yellow, mixed with the aecidia, 90–100 μ diameter.

I. Aecidia amphigenous in circular or elliptic groups, 4–8 mm. diam. on oval yellow leaf-spots, pale yellow, cupulate, about 300 μ diam.; margin of the peridium white, revolute, lacerate, cells of the peridium firmly joined, irregularly polygonal, 25–30 × 15–25 μ, outer wall striate, 10–12 μ thick, inner verruculose 3–4 μ thick. Aecidiospores angular-globose to ellipsoid, 26–33 × 18–24 μ; wall hyaline, about 1·5 μ thick, closely and minutely verruculose.

II. Uredo-sori amphigenous, scattered or becoming crowded, light brown, round to oblong, 0·5–0·75 mm. long, surrounded or partly veiled by the torn epidermis, rather compact. Uredospores sub-globose, broadly ellipsoid or ovate, very light brown or sub-hyaline, 23–30 × 20–24 μ; epispore sub-hyaline, about 2 μ thick, closely and minutely echinulate and with numerous (about 8–12) small scattered germ pores.

III. Teleuto-sori, similar to the uredo-sori, but usually smaller, black, and remaining long covered by the epidermis. Teleutospores variable in form, ovate, broadly cuneate, sub-globose or ellipsoid, often irregular and angular, apex rounded, truncate or somewhat acute, base attenuate or rounded, chestnut-brown, contents granular, nucleus often conspicuous, 25–34 × 20–27 μ; epispore smooth, 3–3·5 thick, not thickened at the apex; pedicel short, persistent, hyaline or tinted at the apex, up to 35 μ long.



Uromyces Lachenaliae.
Teleutospores.

Hosts: Lachenalia pendula Ait., Municipal Gardens, Capetown, 8.8.12 [5140].

L. tricolor Thun. var. Nelsoni, Slangkop Mountains, Cape Province, 7.9.24, Andreae [19853].

L. unicolor Jacq., Williston, Cape Province, August, 1914, Glover [8369].

Polyxena ensifolia (Thun.) Schon., Uitenhage, 15.5.12, Pienaar [2437].

Distribution: Cape Province.

Ornithogalum L.

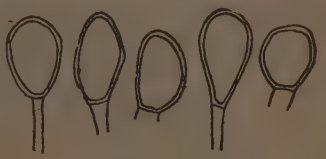
60. **Uromyces Maireanus** Syd.

in Monogr. Ured. II, p. 280.

II. Uredo-sori amphigenous on irregular, pale leaf-spots, scattered or in small groups, elliptic or oblong, about 0·3–0·5 mm. long, remaining rather long covered by the epidermis

or partially veiled by it, yellow-brown, pulverulent. Uredospores globose, sub-globose or ellipsoid, 20–30 × 16–24 μ; epispore about 1·5 μ thick, delicately echinulate and with 4–7 small, scattered germ pores.

III. Teleuto-sori similar, but up to 1 mm. long, black and long remaining covered by the greyish epidermis. Teleutospores yellow-brown, sub-globose, ovate, ellipsoid or pyriform, usually rounded at the apex, attenuate or rounded at the base, 20–34 × 16–24 μ; epispore smooth, about 1·5 μ thick, not thickened at the apex; pedicel slightly coloured, up to 30 μ long, persistent,



Uromyces Maireanus. Teleutospores.

Host: Ornithogalum Roodeae, Clanwilliam, Cape Province, 18.8.23, Rood [17288].

Distribution: South Africa, Algeria.

The 150 species of the genus Ornithogalum are widely distributed in the old world; there are ninety-three in South Africa.

Polyxena Kunth.

cfr. Lachenalia.

Scilla L.

61. **Uromyces circinalis** Kalch. et Cke.

in Grevillea VIII, 1879, p. 71, Syd. Monogr. Ured. II, p. 281.

Syn. *Uromyces MacOwani* Bubak in Sitzungsber, d. konigl. bohm. Gesellsch. d. Wissensch. 1902, p. 19 (extr.).

III. Teleuto-sori amphigenous, usually in round groups, 2–8 cm. in diam., minute, round, up to 0·75 mm. diam., long covered by the epidermis, pulverulent, cinnamon-brown. Teleutospores globose, sub-globose or ovate, often angular and broader than long, apex rounded or truncate, light brown, 18–20 × 16–26 μ; epispore smooth, rather thick, about 2–3 μ thick, not thickened at the apex, pedicel hyaline, deciduous, equalling the spore or longer.

Host: Scilla prasina Baker, Somerset East, Cape Province, Mac Owan.

Distribution: Cape Province.

This species is not represented in the National Herbarium nor in the South African Museum collection.

The host is one of the seventy-five indigenous species of Scilla; the other seventy-five species are widely distributed in the old world.

62. **Uromyces bylianus** sp. nov.

III. Teleuto-sori amphigenous, on brown, oval leaf spots, usually developing centrifugally in elliptic groups 5–10 mm. long, single sori small, round to oblong, up to 1 mm. long, soon becoming confluent, black, remaining long covered by the epidermis which finally slits longitudinally, pulverulent. Teleutospores ovate or broadly ellipsoid, not infrequently flattened-globose and shorter than broad, chestnut-brown, apex rounded or rarely truncate, base rounded, more rarely attenuate, 20–34 × 18–27 μ; epispore smooth 1–1·5 μ thick; usually slightly thickened at the apex (up to 5 μ); pedicel short, sub-persistent, hyaline.

Uromyces bylianus. Teleutospores.

Host: Liliaceae undet (?Chlorophytum ?Anthericum), Llewellyn, East Griqualand, 6.9.13, Van der Bijl, [6944].

Species parasitic on **Commelinaceae.**

63. **Uromyces Commelinae** Cke.

in Trans. Roy. Soc. Edinb., 1887, p. 342; Syd. Monogr. Ured. II, p. 292 et IV, p. 595.

Syn. *Uredo Commelinae* Speg. in Anal. Soc. Sci. Argent. IX, 1880, p. 172 (nec Kalch.)

U. Spegazzinii De Toni in Sacc. Syll. Fung. VII, p. 845 (1888).

U. ochracea Diet. in Hedwigia XXXVI, p. 35 (1897).

U. commelinacea Ell. and KaH. in Bull. Torr. Bot. Club. XXIV, p. 209 (1897).

U. Myoshiana Diet. in Sydow. Ured. No. 1348 (1899).

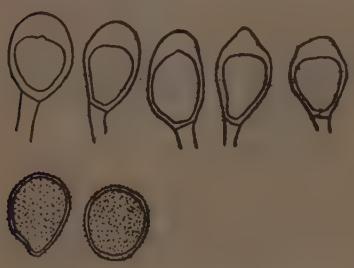
Uromyces Commelinae Cke. var. abyssinica P. Henn. Fg. Aethiop. I, p. 106, et in Engl. Jahrb., XVII, 1893, p. 10.

U. tosensis P. Henn. in Hedwigia XLII, 1903, p. 107.

U. Spegazzinii Arth. in Bull. Torr. Bot. Club. XXVII, 1910, p. 573.

Nigredo Commelinae Arth., N. Am. Flora 7, p. 237, 1912.

II. Uredo-sori amphigenous and caulicolous, mostly hypophyllous, often on small yellow leaf-spots, scattered or in groups, round, 0·5–1 mm. diam., soon becoming naked, surrounded by the torn epidermis, cinnamon-brown, pulverulent. Uredospores ellipsoid, ovate or sub-globose, yellow-brown to deep cinnamon-brown, 22–35 × 19–25 μ; epispore yellow-brown, 1·5-2·5 μ thick, delicately echinulate and with two conspicuous papillate equatorial germ pores.



Uromyces Commelinae.
Teleutospores and uredospores.

III. Teleuto-sori amphigenous, mostly hypophyllous, often on the same leaf-spots as the uredo-sori, scattered or becoming crowded and confluent, round or elliptic, 0·5–1 mm. long, surrounded by the torn epidermis, rather compact, dark brown or black. Teleutospores subglobose, ovate, ellipsoid or oblong, brown, apex rounded conical or truncate, base rounded or subattenuate, 25–34 × 16–27 μ; epispore smooth, about 3 μ thick, strongly thickened at the apex (up to 14 μ); germ pore apical; pedicel hyaline or yellowish sub-persistent, up to 60 μ long.

Hosts: Aneilema sp., Salisbury, Rhodesia, February, 1920, Eyles [13993].

Commelina Krebsiana Kunth., near Pietersburg, Northern Transvaal, 2.8.11, Doidge [1818]; Garstfontein, Pretoria District., May 1911, Pienaar [1839]; Oliphants River Tank, Transvaal, 14.1.18, Pole Evans [11023].

Commelina Livingstoniae Clarke, Chalasi, Maputo R., Portuguese East Africa, 10.4.09, Howard [630]; Matlotla, Portuguese East Africa, 28.4.09, Howard [673].

Commelina sp., Komati Poort, Pole Evans [11711].

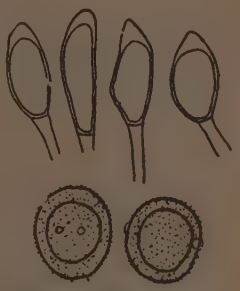
Distribution: Africa, North and South America, East India, Japan, Formosa, and the Philippines.

The genus Commelina is represented in all warm countries; there are four South African species.

64. **Uromyces pretoriensis** n. sp.

II. Uredo-sori amphigenous and caulicolous, scattered or becoming confluent, dark brown, round to elliptic, up to 1 mm. diam., soon becoming naked, surrounded by the torn epidermis. Uredospores chestnut-brown, globose, sub-globose, broadly ellipsoid or oblong, 23–35 × 23–27 μ; epispore deep brown, 4–5 μ thick, briefly but rather coarsely and sparsely echinulate; germ pores equatorial, conspicuous, 1–3, usually 2.

III. Teleuto-sori usually hypophyllous, minute, in small groups, elliptic, long covered by the epidermis, yellow-brown, pulvinate, compact. Teleutospores pale, yellowish or light brown, ellipsoid, sub-fusoid or oblong, apex conical or rounded, base attenuate, more rarely rounded, 30–45 × 11–17 μ; epispore smooth, about 1·5 μ thick, thickened at the apex (up to 9 μ); germ pore apical; pedicel persistent, yellowish, up to 80 μ long.



Uromyces pretoriensis. Teleutospores and uredospores.

Host: Commelina africana L., The Willows, Pretoria District, 10.3.12, Pole Evans [2221 and 2442].

Distribution: Transvaal.

Distinguished from Uromyces Commelinae by the longer narrower teleutospores, with thin epispore.

Species parasitic on **Araceae.**

65. **Uromyces Stylochitonis** (Cke.) Doidge.

Syn. *Aecidium aroideum* Cke. in Grevillea VIII, 1879, p. 71; Syd. Monogr. Ured. IV, p. 290.

O. Spermogones amphigenous, not numerous, irregularly grouped, at first honey-yellow, then red-brown, 100–120 μ diam.

I. Aecidia hypophyllous, an occasional one being epiphyllous, on yellow leaf-spots 3–8 mm. diam., arranged in circles or irregularly grouped, often surrounding the spermogones, cupulate, 250–300 μ diam.; margin of the peridium slightly reflexed, white, delicately toothed; cells of the peridium firmly joined together, 25–35 × 18–23 μ. Spores angular globose, ovate or ellipsoid, sub-hyaline, 17–25 × 16–22 μ; wall 1 μ thick, closely and minutely verruculose.

III. Teleuto-sori amphigenous, scattered or in groups amongst the old aecidia, very minute, brown, spherical, deeply immersed in the leaf tissues and remaining covered, 60–90 μ diam. Teleuto-spores irregular in shape, sub-spherical, ellipsoid or ovate, usually irregularly angular by compression, light brown, apex rounded, truncate or acute, base rounded or sub-attenuate, 22–30 × 16–23 μ; epispore smooth, 2–2·5 μ thick, usually slightly thickened (up to 5 μ) at the apex. Pedicel hyaline, persistent, short, up to 25 μ long.

Uromyces Stylochitonis. Teleutospores.

Host: Stylochiton natalense Schott., Inanda, Natal, Medley Wood 114 [10279]; Malvern, Natal, 18.3.10 and 28.12.11, Doidge [776 and 1995].

Distribution: Natal.

The genus Stylochiton consists of ten species; these are all African, two occurring in the Transvaal and Natal.

Species parasitic on **Gramineae.**

Brachiaria Gris.

cfr. Panicum.

Chloris Sw.

66. Uromyces Chloridis n. sp.

II. Uredo-sori hypophyllous, minute, linear, light brown, long covered by the epidermis. Uredospores golden-brown, broadly ellipsoid or sub-globose, 23–29 × 20–24 μ; epispore golden-brown, about 3 μ thick, very delicately verruculose-echinulate, and with 2–3 scattered germ pores.

III. Teleuto-sori amphigenous, mostly hypophyllous, linear, dark brown or black, up to 2 mm. long, often confluent and forming pulvinate streaks, up to 1 cm. long and 1·5 mm. broad, often almost completely covering large areas of the leaf. Teleutospores chestnut-brown, sub-globose, broadly ellipsoid or oblong, rounded at the apex, rounded or sub-attenuate at the base, 22–30 × 20–23 μ; epispore smooth, 3–3·5 μ thick, strongly thickened at the apex (up to 10 μ); germ pore apical; pedicel hyaline, or tinted brown near the apex, rather stout, persistent, about 6 μ thick and up to 120 μ long.

Uromyces Chloridis.
Teleutospores.

Host: Chloris virgata Sw., Skinner's Court, Pretoria District, 7.3.06 [43]; Bloemfontein, 4.1.17, Potts [11317].

Digitaria Rich.

67. Uromyces Peglerae Pole Evans.

Ann. Myc. 12, 1914, p. 263; Syll. Fung. 23, p. 644.

II. Uredo-sori amphigenous, mostly hypophyllous, scattered, ochraceous, elliptic, up to 1 mm. long, long covered by the raised epidermis, later splitting longitudinally and remaining partially veiled by the torn epidermis. Uredospores sub-globose or ellipsoid, yellow, 23–29 × 16–22 μ; epispore sub-hyaline, 2–3 μ thick, very delicately verruculose and with 3–4 scattered germ pores.

III. Teleuto-sori hypophyllous, scattered, black, minute, ellipsoid, long covered by the epidermis. Teleutospores irregular in shape, ovate, ellipsoid or pyriform, often angular by compression, apex rounded, more rarely truncate or somewhat acute, base attenuate or sub-rounded, brown, deeper at the apex, 21–30 × 16–23 μ; epispore smooth, 2·5–3 μ thick, somewhat thickened at the apex (up to 5 μ), germ pore apical; pedicel sub-persistent, light brown, up to 35 μ long.

Uromyces Peglerae.
Teleutospores.

Hosts: Digitaria ternata Stapf., on leaves, Town Bush Valley, Maritzburg, 7.4.11, Pole Evans [1441]; Barberton, March, 1911, Lounsbury [1284]; Cedara, Natal, 1.3.12, Fisher [2074]; Pretoria, 8.4.18, Pole Evans [11686]; Kentani, Cape Province, 30.4.14, Pegler [7755]; Kokstad, East Griqualand, 7.4.18, Mogg [14146].

Digitaria debilis Willd., Kentani, 5.6.12, Pegler 1879 [8881].

Digitaria sanguinalis Scop., Mooi River, Natal, 21.3.17, Mogg [10069].

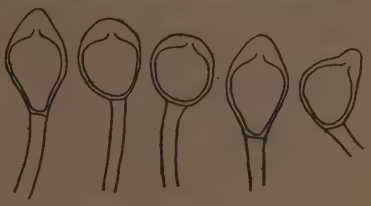
Digitaria sp., Mt. Edgecombe, Natal, 13.4.11, Pole Evans [1405].

Distribution: South Africa.

Ehrharta Thun.

68. **Uromyces Ehrhartae-giganteae** n. sp.

III. Teleuto-sori amphigenous, but mostly culmicolous, ellipsoid or oblong, up to 2 mm. long, or becoming confluent and forming longer lines, dark brown, pulvinate, compact, surrounded by the torn epidermis. Teleutospores sub-globose, ovate, oblong or ellipsoid, chestnut-brown, apex rounded or more rarely broadly conical, base rounded or attenuate, 23–37 × 16–24 μ; epispore smooth, 1·4–2 μ thick, thickened at the apex, usually 6–7 μ, rarely up to 10 μ; germ pore apical, conspicuous; pedicel hyaline, persistent, rather stout, about 5 μ thick and up to 120 μ long.



Uromyces Ehrhartae-giganteae. Teleutospores.

Host: Ehrharta gigantea Thun., Mowbray, Cape Province, 10.2.14 and 7.12.14, van der Merwe [7392].

Distribution: Cape Province.

This species is quite distinct from U. Ehrhartae McAlp., which occurs in Australia; it differs in the darker broader teleutospores with rounded apices, which are usually only slightly thickened. The teleutospores of U. Ehrharta are more slender, thinner walled, and have usually more or less acute, strongly thickened apices.

The host occurs only in South Africa.

Eragrostis Beauv.

69. **Uromyces Eragrostidis** Tracy.

in Jour. of Myc., 1893, p. 281; Syd. Monogr. Ured. II, p. 326.

Syn. *Uromyces pedicellata* Pole Evans in Kew Bulletin, 1918, p. 228.

Nigredo Eragrostidis Arth. Résult. Sci. Congr. Bot. Vienne, p. 343, 1906.

II. Uredo-sori amphigenous, mostly epiphyllous, scattered, 0·5 to 1 mm. long, or becoming confluent and forming longer lines, long covered by the epidermis, yellow-brown. Uredospores light brown, globose, sub-globose or ovate, 22–27 × 17–23 μ; epispore 1·5–2 μ thick, light brown, delicately echinulate and with 4–7 germ pores, which are conspicuous, scattered, papillate.

III. Teleuto-sori amphigenous or culmicolous, minute, oblong or linear, long covered by the epidermis, black. Teleutospores chestnut-brown, rather variable in form, sub-globose, oblong or clavate, sometimes oblique or angular, apex rounded or more rarely truncate, base attenuate or sub-rounded, 20–30 × 15–22 μ; epispore smooth, about 1·5 μ thick, not thickened at apex, or slightly, so (up to 4 μ); pedicel persistent, hyaline tinted brown at the apex, up to 45 μ long.

Uromyces Eragrostidis. Teleutospores.

Hosts: Eragrostis abyssinica Link., Skinner's Court, Pretoria District, April, 1916, 13.2.07, Pole Evans [13, 261, and 266]; Pretoria, 31.1.11, Pole Evans [1083]; Skinners Court, 27.5.12, Pole Evans [2335]; Lang laagte, Krugersdorp District, 3.4.15, Fry [8945]; Pretoria, 4.3.18, Pole Evans [11318].

Eragrostis curvula Nees., Skinner's Court, 10.1.07, Pole Evans [246]; Pretoria, 2.3.18, Pole Evans [11319].

Eragrostis superba Peyr., Vryburg, June, 1919, Theiler [12243].

Distribution: South Africa, North America, and East India.

With the exception of No. 8945, the type specimen of Uromyces pedicellata, all the collections mentioned show the uredo-stage only. I am indebted to Dr. Weir, who is in charge of the pathological collections at Washington, for authentic specimens of U. Eragrostidis, including a piece of the type material. On comparison, I think that there can be no doubt that the two species are identical.

Eragrostis abyssinica Teff, is a tropical African grass, and is one of the most valuable hay grasses which has been introduced into cultivation. E. curvula and E. superba are both indigenous. The rust is not conspicuous, and does not appear to cause serious damage.

Panicum L.

70. **Uromyces leptodermus** Syd.

in Ann. Myc. IV (1906), p. 430 et V (1907), p. 592; Monogr. Ured. II, p. 334.

Syn. *Uredo Isachnes* Syd. Ann. Myc. IV, 1906, p. 444.

U. Panici-prostrati Syd. Ann. Myc. IV, 1906, p. 444.

Nigredo leptoderma Arth. N. Am. Flora 7, p. 224, 1912.

II. Uredo-sori amphigenous, scattered or in groups, minute, round or oblong, about 0·3–·75 mm. long, soon becoming naked, pulverulent, cinnamon brown. Uredospores globose, sub-globose, ellipsoid or irregular, often triangular in transverse section, with a germ pore at each angle, light brown, 20–34 × 18–25 μ; epispore yellow-brown, 1·5–2 μ thick, very delicately and closely echinulate, and with 2–4 (usually 3) equatorial germ pores.

[III. Teleuto-sori amphigenous, scattered, very minute, about 0·5 mm. diam., punctiform, long covered by the epidermis, black. Teleutospores variable in form, sub-globose, angular-globose, ovate or oblong, light brown, 18–30 × 14–21 μ; epispore very thin (about 1 μ), smooth, not thickened at the apex; pedicel hyaline, thin, about equalling the spore.]

Hosts: Brachiaria Isachne Stapf., Harden Heights, Natal, 11.4.11, Pole Evans [1454]; Tweedie, Natal, Mogg [11646].

Panicum laevifolium Hack, Skinner's Court, Pretoria District, 20.1.07, 10.1.07, 9.12.09 [248, 267, 721]; Witbank, Transvaal, 20.1.11, Walters [1249]; Langlaagte, Transvaal, 15.4.15, Fry [8951]; Roberts Heights, Pretoria District, 19.1.15, Pole Evans [8931]; Bloemfontein, Orange Free State, 4.17, Potts [11308].

Panicum maximum Jacq., Winkle Spruit, Natal, 2.7.11, 5.6.12, Pole Evans [2394, 1596].

Urochloa helopus Stapf., Umbelusi, Portuguese East Africa, 25.5.08, Howard [670]; Barberton, Transvaal, 20.4.14, Mogg [7807].

Urochloa trichopus Stapf., Pienaar's River, Pretoria District, 25.5.15, Schmolle [9097].

Distribution: South Africa, East India.

Only the uredo-stage has been found in South Africa; the sori and spores, however, are very characteristic, and agree in every respect with those of Butler's East Indian collections. The description of the teleuto-sori is taken from Sydow's monograph (*loc. cit.*).

The hosts are indigenous to South and tropical Africa. Urochloa helopus extending to Mauritius and India. Panicum maximum, Guinea grass, has been introduced into India and America, and is now widely spread in those countries.

Sporobolus R.Br.

71. **Uromyces tenuicutis** McAlp.

in Rusts of Australia, 1906, p. 87; Syd Monogr. Ured. II, p. 341.

II. Uredo-sori amphigenous, but usually epiphyllous or on the culms, on indistinct yellow spots, minute, elliptic or oblong, 0·5 mm. long, sometimes up to 1 mm. long, at first covered by the epidermis, which finally becomes ruptured and surrounds the sori, yellow-brown, pulverulent. Uredo-spores sub-globose, ovate or ellipsoid, yellow, 25–40 × 18–26 μ; epispore about 2 μ thick, echinulate, with 3–4 germ pores.

III. Teleuto-sori hypophyllous, scattered, elliptic or oblong, 0·3–0·75 mm. long, black, long covered by the epidermis. Teleutospores ovate, pyriform or oblong, rounded, acute or truncate at the apex, attenuate at the base, yellow-brown, darker at apex, 21–35 × 16–25 μ; epispore smooth, about 1 μ thick, slightly thickened (up to 4 μ) at the apex; pedicel subpersistent, brownish, up to 35 μ long.

Uromyces tenuicutis. Teleutospores.

Host: Sporobolus indicus R. Br., Barberton, 20.4.14, Mogg [7808].

Distribution: South Africa, Australia.

Sporobolus occurs in South Africa and tropical Africa, and in Australia.

Urochloa Beauv.

cfr. Panicum.

PUCCINIA Pers.

Lentam, dispos. meth., p. 38 (1797).

Autoecious or heteroecious.

O. Spermogones, when present, usually epiphyllous, globose or flask-shaped, immersed, honey-yellow.

I. Aecidia, when present, at first usually immersed, globose, closed, becoming open and cupulate or cylindrical. Peridium usually well developed, occasionally evanescent. Aecidiospores produced seriatim from the tips of hyphae and early becoming free from one another, globose, sub-globose, angular or ellipsoid; contents often yellow or orange; epispore usually hyaline, verruculose, seldom tinted, with numerous, scattered and indistinct germ pores.

II. Uredo-sori, when present, usually minute, pulverulent, with or without paraphyses, and usually surrounded by the ruptured epidermis. Uredospores formed singly on their pedicels, globose, sub-globose, ellipsoid or obovate; epispore echinulate or less frequently verrucose, coloured or hyaline, and with 2 or several, more or less evident germ pores (rarely one).

III. Teleuto-sori varying in size, pulvinate or pulverulent. Teleuto-spores typically two-celled (rarely one or several celled), septum horizontal, rarely oblique, or more rarely still, vertical, borne singly on the apices of distinct pedicels, with one distinct germ pore in each cell; epispore smooth or variously sculptured.

South African species 132, of which 83 are indigenous to South Africa and 9 extend into tropical Africa; several other species occur only in Africa and East India.

Species parasitic on the **Compositae.**

Artemisia L.

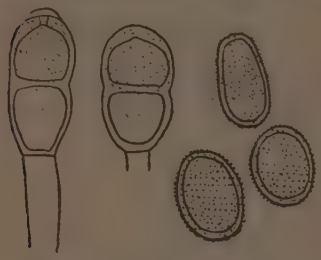
1. Puccinia Absinthii, DC.

Encycl. VIII, p. 245 et Fl. franç VI, p. 56; Syd Monogr. Ured I, p. 11.

Syn.· *Trichobasis Artemisiae* Berk., Cooke Micr. Fung., p. 223.
Puccinia Discoidearum Link., Cooke Micr. Fung., p. 206.
P. Tanaceti Plowr. Ured., p. 189, Sacc. Syll. Fung. VII, p. 637.
Bullaria Absinthii Arth. et Mains., N. Am. Flora VII, p. 508, 1922.

II. Uredo-sori usually hypophyllous, scattered or in groups on yellowish or indefinite leaf-spots, minute, more or less round, not confluent, light brown, pulverulent. Uredospores globose to ovoid, pale yellowish brown, 20–35 × 15–26 μ; epispore 2–3 μ thick, echinulate, usually with three sub-equatorial germ pores, which are covered with paler swollen caps.

III. Teleuto-sori amphigenous, but generally hypophyllous, or sometimes on the stems, similar to the uredo-sori, but sometimes confluent, soon naked, dark brown or almost black. Teleutospores oblong to oblong-clavate, rounded at the apex, constricted at the septum, slightly attenuated towards the base, brown, 38–62 × 20–27 μ; epispore thickened at the apex (up to 7 μ), the upper cell punctate or verruculose, the lower frequently smooth, especially at the base; germ pores apical and just below the septum, covered with paler, swollen caps; pedicels hyaline, thick, persistent, up to 80 μ long.



Puccinia Absinthii.
Teleutospores and uredospores.

Host: Artemisia afra Jacq., on living leaves, Inanda, Natal, August, 1881, Medley Wood 625 [10472 and 11156].

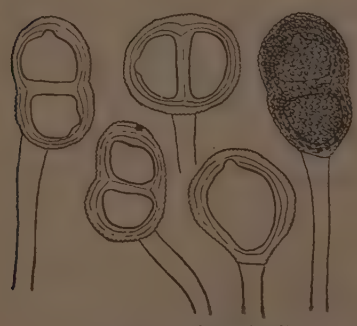
Distribution: South Africa, Europe, Siberia, Japan, North America; only known in South Africa from the single collection made by Medley Wood in 1881. The genus Artemisia occurs mostly in the northern hemisphere; it is represented in South Africa only by one species which is common in the coast districts of Natal, and rare in the inland districts.

Berkheya Ehrh.

2. Puccinia berkheyicola n. sp.

II. Uredo-sori amphigenous, scattered, minute, round or oval, up to 0·5 mm. diam., ochraceous, pulverulent. Uredospores chestnut-brown, globose, sub-globose, ovoid or rarely ellipsoid, 25–34 μ diam.; epispore moderately echinulate, about 3 μ thick and with three germ pores.

III. Teleuto-sori amphigenous, mostly hypophyllous, interspersed with the uredo-sori, almost black, scattered or in small groups, round or angular, up to 1 mm. diam., raised, pulverulent, surrounded by the torn epidermis. Teleutospores sub-globose, ovoid or somewhat asymmetrical, broadly rounded at base and apex, rarely somewhat attenuated towards the base, slightly constricted at the septum, 36–44 × 26–33 μ, rarely up to 54 μ long; epispore verrucose with large rounded warts, 5–6·5 μ thick, laminate, not thickened at the apex or very slightly so; germ pores usually distinct, in the upper cell apical or slightly oblique, in the lower cell about mid-way between the base and the septum; pedicel stout, persistent, slightly coloured, often inserted obliquely or transversely, tapering towards the base, 8–10 μ thick just below the spore and up to 110 μ long.



Puccinia berkheyicola.
Teleutospores and one mesospore.

X. Mesospores fairly numerous, ovoid or sub-globose, 36–40 × 30–36 μ; epispore similar to that of the teleutospores; germ pore apical, pedicel often obliquely inserted.

Host: Berkheya setifera DC, on leaves, III Spion Kop, Natal, 5.7.13, Wager [6830]; III Kaalfontein, Transvaal, 29.4.16, Pole Evans [9731]; II and III Kaalfontein 27.3.17, Pole Evans [10079]; II and III Kaalfontein, 22.2.18, Mogg [11654].

Distribution: Transvaal and Natal.

This species is quite distinct from Puccinia Stoboeae MacOwan and its variety Woodii Syd. It differs chiefly in the non-thickened apex of the spores, the thick, laminate and warted epispore and the frequently oblique or transverse pedicel. It also differs widely from P. Berkheyae Wakefield (Kew Bull. 1917, p. 313).

Berkheya is an African genus of 114 species of which 93 species occur in South Africa.

3. **Puccinia Stoboeae** MacOwan.

in Grevillea XI, p. 23; Syd. Monogr. Ured. I, p. 158, Pole Evans, Trans. Roy. Soc., South Africa V, p. 638.

Syn. *Aecidium Berkheyae* P. Henn. et Evans in Engl. Bot. Jahrb. XLI, 1908, p. 372 (erronee sub-nomine *Aecidii Berkleyae*); Syd. Monogr. Ured. IV, p. 28.

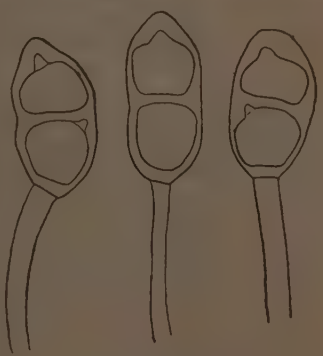
Puccinia cryptica Cke. in Grevillea XX, p. 108.

O. Spermogones epiphyllous, in small groups on round, yellowish leaf-spots, honey-yellow.

I. Aecidia hypophyllous, on round, yellowish-brown leaf-spots up to 5 mm. diam. and sometimes forming larger areas by confluence, in small groups of 3–5, cylindrical, 300–400 μ diam.; margin of the peridium white, fimbriate-lacerate; cells of the peridium rather loosely connected, oblong, 50–80 × 28–38 μ, outer wall almost smooth, 2–3 μ thick, inner verrucose 3–4 μ thick. Aecidiospores globose, sub-globose or broadly ellipsoid, angular, hyaline or yellowish, 20–29 × 18–27 μ, epispore densely verruculose.

II. Uredo-sori amphigenous, on the under side of the leaf often concealed under the tomentose hairs, on the upper side of the leaf pulverulent, scattered or in irregular confluent groups, dark brown. Uredospores globose, oval or somewhat ellipsoid, brown, 25–40 μ diam.; epispore 2–3 μ thick, strongly echinulate and with three conspicuous equatorial germ pores.

III. Teleuto-sori mostly hypophyllous, scattered or in small groups. Teleutospores ellipsoid or oblong, at the apex more or less bluntly acuminate, rarely somewhat rounded, slightly constricted at the septum, usually rounded at the base, rarely tapering towards the pedicel, 40–68 × 21–32 μ; epispore 2–3 μ thick, strongly thickened at the apex (up to 14 μ), smooth or very delicately punctate; germ pore in the upper cell apical, rather obscure, in the lower cell just below the septum. Pedicel hyaline, persistent, thick, slightly thickened at the base, up to 124 μ long.



Puccinia Stoboeae. Teleutospores.

X. Mesospores not infrequent, oval, rounded at at the base, apex somewhat prolonged and thickened, 36–40 × 26–30 μ.

Hosts: Berkheya latifolia Wood et Evans, on leaves. I. Pretoria, 12.11.06, Pole Evans [204]; I, Irene, near Pretoria, 2.11.08, Pole Evans [539]; O.I. Koedoespoort, Pretoria District, 18.11.08, Pole Evans [747]; III, Garstfontein, Pretoria District, 8.4.11, Pienaar [1437]; I, Garstfontein, 6.12.11, Pienaar [1948]; II and III, Garstfontein, 15.2.12 [2148]; III, Garstfontein, 14.5.13 [6659].

Berkheya (Stoboea insignis, Harv.) I, Barberton, 4.2.11, Pole Evans [1155]; III, Lemana, Spelonken, Northern Transvaal, 14.8.11, Doidge [1814]; III, Barberton, 29.8.11, Pole Evans [1855].

Berkheya (Stoboea Kuntzei O. Hoffm.), I, II, and III, Zuurvlakte, Aliwal North, 15.1.12, Pienaar [2006].

Berkheya spp. undet. III, Garstfontein, Pretoria District, 8.4.11, Pienaar [1424]; II and II, Garstfontein, 30.3.12, [2185]; II Estcourt, Natal, 29.7.12, Pole Evans [5145]; III, Wakkerstroom, Transvaal, 24.3.16, Kretzschmar [14195]; II and III, Mont aux Sources, Natal, 13.5.20, Doidge [14197].

Distribution: South Africa.

This rust was originally described by MacOwan on the leaves of Stoboea membranifolia and Stoboea speciosa near Somerset East; it appears to be of common occurrence throughout South Africa. The aecidium appears during the months of November and December near Pretoria, and has been collected in January at Aliwal North and as late as February near Barberton. The teleuto-stage is common from February to May near Pretoria, and has been found as late as July and August in Natal and in the low country.

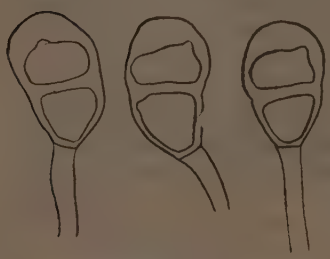
—— var. **Woodii** Syd.

in Monogr. Ured. I, p. 160; Pole Evans, Trans. Roy. Soc., South Africa V, p. 639.

Syn. *Aecidium Stoboeae* Kalch. et Cke. in Grevillea VIII, p. 79.

I. Aecidiospores densely verrucose, with rather large, prismatic warts, 2–2·5 μ diam.

II. Uredospores, 20–28 μ diam., with three equatorial germ pores; epispore, 1·5–2 μ thick echinulate.



Puccinia Stoboeae var. *Woodii* Teleutospores.

III. Teleutospores broadly ellipsoid, rarely suboblong, always broadly rounded at the apex and rounded at the base, not constricted at the septum or very slightly so, brown, 43–57 × 27–38 μ; epispore 2–2·5 μ thick in the lower cell, 3–3·5 μ thick in the upper, except at the apex where it is strongly thickened (up to 12 μ), smooth or very delicately punctate; germ pore in upper cell apical or at a point about one-third of the distance from the apex to the septum, in the lower cell lateral, not always immediately below the septum.

Hosts: Berkheya seminivea Harv. et Sond. I, Umgeni Lagoon, Durban, 21.3.10, Doidge [905]; I, Eshowe, Zululand, 30.1.12, Pole Evans [2028]; I, Ungeni Beach, Durban, 4.6.12 [2413].

Berkheya umbellata DC., II and II, Town Bush Valley, Maritzburg, 7.4.11, Pole Evans [1446]; II and III, Eshowe, 30.1.12, Pole Evans [2023]; II and III, Winters Kloof, Natal, 30.6.12, Doidge [2518].

Berkheya (Stoboea epistachys DC.), II and III, without locality (from the McGregor Museum, Kimberley) [14680].

Distribution: Natal and Zululand.

In particulars other than those mentioned above, the variety resembles the type. The delicate punctations of the epispore are not mentioned by Sydow or Pole Evans, and cannot be detected in every collection. The variety was originally collected by Medley Wood at Durban, and there is no record of its occurrence in the Transvaal or in the Cape Province.

The type and the variety have not, up to the present, been found on the same species of Berkheya.

Centaurea L.

4. **Puccinia Cyani** (Schleich) Pass.

in Rabh. Fung. Eur. No. 1767; Syd. Monogr. Ured. I, p. 38.

Syn. *Uredo Cyani Schleich.* Pl. Halv. 95.

U. Cyani D.C. Fl. franc. VI, p. 74.

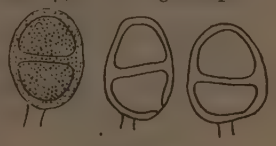
Puccinia suaveolens (Pers.) forma *Cyani* Wint. Pilze. Deutschl., p. 190, Sacc. Syll. Fung. VII, p. 633.

P. inquinans Wallr. var. *Cyani* Wallr. Fl. crypt. germ. II, p. 219.

Bullaria Cyani Arth. Résult. Sci. Congr. Bot. Vienne, 346, 1906.

II. Uredo-sori usually hypophyllous, without leaf-spots, scattered or crowded, minute, orbicular or elliptic, pulverulent, cinnamon-brown. Uredospores globose, sub-globose or ovate, delicately echinulate, yellow-brown, 22–30 × 19–24 μ, with 2 germ pores.

III. Teleuto-sori amphigenous, scattered, minute, punctiform, pulverulent, dark brown. Teleutospores broadly ellipsoid, rounded at both ends, not constricted, chestnut-brown, 30–35 × 22–27 μ; epispore about 3 μ thick, very delicately verruculose, not thickened at the apex, germ pores lateral, about one-third to one-half of the distance from apex to septum and from base to septum; pedicel hyaline, short.



Puccinia Cyani. Teleutospores.

Host: Centaurea Cyanus L., on living leaves and stems, Daspoort, Pretoria District, 4.11.05, Pole Evans [113].

Distribution: South Africa, western and central Europe.

Not uncommon in English gardens (Grove), but only represented in the National Herbarium by the single collection mentioned above; it may possibly be more common than this would indicate.

Chrysanthemum L.

5. **Puccinia Chrysanthemi** Roze.

in Bull. Soc. Myc. France, 1900, p. 92; Syd. Monogr. Ured. I, 46; Pole Evans Trans. Roy. Soc. S. Africa V, 640–641.

Syn. *Uredo Chrysanthemi* Roze. *loc. cit.*, p. 78.

Puccinia Chrysanthemi-chinensis, Henn. Hedwigia XL, 26 (1901).

Bullaria (?) *Chrysanthemi* Brth. Résult. Sci. Congr. Bot. Vienne, 346, 1906.

II. Uredo-sori usually hypophyllous (sometimes amphigenous), on dead brown leaf-spots, which are visible on the upper side of the leaf, sometimes also caulicolous, cinnamon-brown, scattered, pulverulent, circular or less frequently elliptical, often forming larger sori by confluence, sometimes circinate, surrounded by the torn epidermis, up to 2 mm. diam. Uredospores ellipsoid or ovoid, more rarely sub-globose, 24–34 × 20–25 μ; epispore 2·5–3 μ thick, moderately echinulate, with three almost equatorial germ pores.

III. Teleutospores mixed with the uredospores or in separate sori. Teleuto-sori mostly hypophyllous, very dark brown to black, circular, scattered or confluent, pulverulent, soon naked; surrounded by the ruptured epidermis. Teleutospores chestnut-brown, oblong, elliptical or subclavate, rounded at the apex, slightly constricted at the septum, usually rounded at the base, seldom attenuate, basal cell usually slightly

Puccinia Chrysanthemi Teleutospores and uredospores.

narrower and lighter in colour than the upper 35–57 × 20–25 μ; epispore 2–2·5 μ thick, delicately verruculose, thickened at the apex up to 7 μ; germ pore of upper cell apical, basal pore immediately below the septum, both rather obscure; pedicel persistent, hyaline, rather stout, 35–60 μ long.

X. Mesospores rare, elliptical to pyriform, slightly thickened at the apex, 32–37 × 20–21 μ.

Host: on leaves and stems of Chrysanthemum indicum L., Johannesburg, 25.5.05, Cregor [177]; Barberton, 14.3.05, Laurence [500]; Pretoria, March, 1909, Pole Evans [660]; Port Elizabeth, 12.4.12, Butters [2235]; Durban, 12.4.12, Moon [2326]; Pretoria, 7.2.15, Pole Evans [8920]; Kentani, May, 1916, Pegler 2400 [9737].

Distribution: South Africa, Europe, Japan, North America, Australia, New Zealand.

Only the uredo-stage has been collected in South Africa; the teleutospores appear to occur only rarely in all other countries where the fungus occurs, except in Japan, where they are said to occur commonly. The teleutospores were described from leaves collected in Japan (Syd. Fung. Exotici Exsicc. 61).

The Chrysanthemum rust is often troublesome in South Africa towards the end of the growing season, in the months of February, March, April, and May. Control measures consist in careful cultivation—particularly in avoiding over-crowding and unnecessarily watering the leaves, in removing and destroying infected leaves as far as possible, and spraying periodically with potassium sulphide solution (1 oz. to 2½ gallons of water).

Cichorium L.

6. **Puccinia Cichorii** (D.C.) Bell.

in Kickx. Fl. Fland. II, p. 65 Syd. Monogr., Ured. I, p. 49.

Syn. *Puccinia Cichorii* Otth. in Sched.
Uredo Cichorii D.C. Fl. franc. VI, p. 74.
Caeoma Cichorii Link. Spec. II, p. 18.

II. Uredo-sori amphigenous or on the stems, scattered, sometimes confluent, minute, pulverulent, surrounded by the torn epidermis, cinnamon-brown. Uredospores globose, sub-globose or ellipsoid, 21–27 μ diam., epispore 1·5 to 2 μ thick, echinulate, with two germ pores.

Puccinia Cichorii. Teleutospores and uredospores.

III. Teleuto-sori similar to the uredo-sori, but very dark brown; teleutospores ellipsoid, rarely obovate, rounded at the apex, not constricted or slightly so, usually rounded at the base, brown, 27–38 × 19–25 μ; epispore thin, smooth, not thickened at the apex; germ pores lateral, one-third to one-half the distance from apex to septum and from base to septum; pedicel short, hyaline.

Host: Cichorium Intybus L., Sea Point, Cape Province, 9.2.18, Collins [11296].

Distribution: South Africa, Europe, Australia.

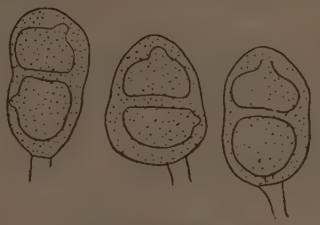
Only known in South Africa from a single occurrence on seedling chicory plants; only uredospores were observed, the teleutospores were drawn from a European specimen (Syd. Myc. Germ. 1211).

Dimorphotheca Moench.

7. **Puccinia Dimorphothecae** Pole Evans.

in Trans. Roy. Soc. S. Africa V, 641.

II. Uredo-sori amphigenous, scattered, interspersed with the teleuto-sori, small, round, up to 1·5 mm. diam., reddish-brown, not very numerous. Uredospores ellipsoid to ovoid or sub-clavate, fuscous, 27–37 × 17–20 μ; epispore 1·5–2 μ thick, minutely echinulate, and with three equatorial germ pores.



Puccinia Dimorphothecae.
(Teleutospores (broad form).

III. Teleuto-sori amphigenous, scattered or in irregular groups, which often become confluent, single sori up to 1·5 mm. diam., round, surrounded by the torn epidermis, black, pulverulent. Teleutospores chestnut-brown, broadly ellipsoid to subglobose, or ellipsoid to cylindrical, broadly rounded at both ends or tapering somewhat at the apex, not constricted or very slightly so, 30–56 × 20–33 μ; epispore 3–3·5 μ thick, slightly thickened (up to 7 μ), or more strongly thickened (up to 10 μ) at the apex, minutely verruculose; germ pore in the upper cell apical, in lower cell lateral, usually not immediately below the septum; pedicel short, hyaline, deciduous, often inserted obliquely.

Hosts: Dimorphotheca spectabilis Schltr. on living leaves, Garstfontein, Pretoria District, 8.4.11, Pienaar [1420]; 2.5.11 [1499]; Kaalfontein, Transvaal, 10.5.16, Pole Evans [9734]; 27.3.17 [10080]; Kaalfontein, Mogg [11664]; Kaalfontein, 18.4.17, Pole Evans [10985]; Johannesburg, 17.5.23, Watson [17103].

Dimorphotheca Zeyheri Sond., near The Willows, Pretoria, 18.5.12, Pole Evans [2310].

The teleutospores vary considerably on different collections; on certain leaves, Nos. 1499, 2310, 10080, and 11664, the ovoid to sub-globose type predominates, with broadly rounded ends and apex only slightly thickened, the spores then measure 30–43 × 25–33 μ. On leaves of other collections the majority are more elongated, with a more definitely thickened apex, often tapering somewhat, the majority measure 43–50 × 20–26 μ. A small percentage of broad spores are found among those of the more elongated type, and vice versa.

Puccinia Dimorphothecae.
Teleutospores (elongated form) and uredospores.

Distribution: South Africa.

This rust has only been collected in the Transvaal in the Pretoria-Johannesburg area. The original description (*loc. cit.*) mentions only the teleutospores; the uredospores have not been described before.

Dimorphotheca is an African genus of twenty-one species, of which twenty species occur in South Africa, mostly in the coastal belt from Namaqualand to Natal.

Felicia Cass.

8. **Puccrnia Feliciae** (Syd.) Doidge.

Syn. *P. capensis* Syd. nec Dietel.

in Ann. Myc. 16, 1918, p. 240; Sacc. Syll. Fung. XXIII, p. 687.

II. Uredospores mixed with the teleutospores, only a few seen, sub-globose or ellipsoid, yellow-brown or brown, 25–30 × 20–23 μ; epispore about 1·5–2 μ thick, sparsely aculeate, and with 2 equatorial germ pores.

III. Teleuto-sori amphigenous, chiefly epiphyllous, solitary or in pairs in the centre of a minute purple or violet spot, minute, long covered by the blistered epidermis, subpulverulent, dark brown. Teleutospores ellipsoid, ovate or oblong, usually rounded at the apex, rounded or often alternate at the base, more or less constricted at the septum, light brown, 32–42 × 16–24 μ; epispore 1·5–2 μ thick, smooth or nearly so; germ pore in the upper cell apical and with a large hyaline papilla, in the lower cell usually near the septum and also with a distinct papilla; pedicel short, hyaline, deciduous.

Host: Felicia sp. (= Diplopappus asper), Somerset East, Cape Province, MacOwan 1468.

Distribution: South Africa.

This species is missing from our collection, the description being taken from the original.

The name Puccinia capensis has been appropiated by Dietel for a species on Moraea tricuspis q.v.

Gerbera Gronov.

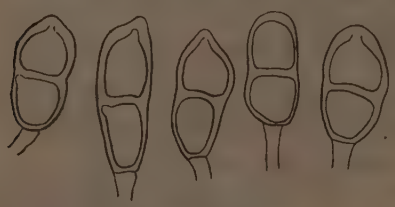
9. **Puccinia Gerberae,** Pole Evans.

in Trans. Roy. Soc. South Africa V, p. 641.

Syn. *Aecidium crypticum* Kalch. et Cke in Grevillea IX, p. 21; Syd. Monogr. Ured. IV, p. 41. [not Puccinia cryptica Cooke]

O. Spermogones epiphyllous, in groups, fairly numerous, brown, 60–90 μ diam.

I. Aecidia amphigenous, producing brown spots, 3–10 mm. diam., on the upper side of the leaf, solitary or in small, more or less circular groups of 3–10, nestling amongst the tomentose leaf hairs, cupulate, 200–250 μ diam.; margin of the peridium erect, lacerate; cells of the peridium rhomboid, 24–34 × 18–24 μ, outer wall striate, 7–11 μ thick, inner wall verrucose, 3–4 μ thick. Aecidiospores angular-globose to ellipsoid, sub-hyaline to flavescent, 16–20 × 15–17 μ; epispore 1 μ thick, very delicately verruculose.



Puccinia Gerberae.
Teleutospores.

II. Unknown.

III. Teleuto-sori amphigenous on purplish or brown leaf-spots, often developing in old aecidia, scattered or in small groups, minute, single sori up to 0·5 mm. diam., or longer if seated on a vein, surrounded by the torn epidermis, pulverulent, but compact and persistent. Teleutospores golden-brown, ellipsoid or sub-clavate, at the apex rounded or bluntly acuminate, usually attenuate towards the base, but sometimes rounded, slightly constricted at the septum, 30–56 × 16·5–23 μ, the majority being 36–43 × 20 μ; 3-celled spores occur; epispore smooth, 1·5–2·5 μ thick, thickened at the apex (up to 6 μ), germ pore in the upper cell apical, in the lower cell just below the septum; pedicel short, hyaline, deciduous.

Hosts: Gerbera ambigua Sch. Bp., on living leaves, I, III, without date or locality, Mogg [11657].

Gerbera discolor Sond. III, Garstfontein, Pretoria District, 8.4.11, Pienaar [1422]; III, Paardeplaats, Lydenburg District, 2.5.11, Pienaar [1531]; III, Kokstad, April, 1918, Mogg [14148]; I, Lydenburg District, 25.1.11, Pienaar [1076].

Gerbera Kraussii Sch. BP. III, Natal, Medley Wood 632 (sub P. Helichrysi) [10480].

Gerbera plantaginea Harv. III, Garstfontein, Pretoria District, 13.4.11, Erasmus [1418]; 3.5.13 [6599]; I, III, Klapmuts, Cape Province, 20.6.13, van der Bijl [6846]; III, Garstfontein, 3.3.15, Pienaar [8887]; I, III, Garstfontein, 6.3.15, Erasmus [8912]; I and III, Kaalfontein, Pretoria District, Mogg [11688].

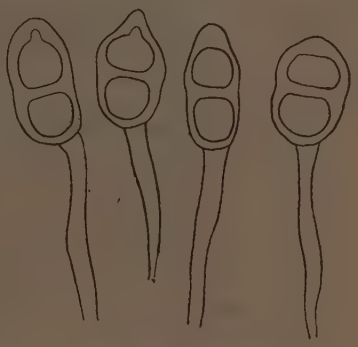
Gerbera spp., I and III, Entumeni, Zululand, Haygarth [14187]; I and III, Natal, Medley Wood 66 (= type of *Aecidium crypticum*) [10286]; Riebeck, Maclear, Cape Province, 26.2.12, Pienaar [2182].

Distribution: South Africa.

Aecidium crypticum is also recorded on Gerbera lanuginosa in East India (Syd. et Butl. in Ann. Myc. V, 1907, p. 504). Medley Wood No. 66, which is the type of Aecidium crypticum Kalch. et Cke., has both aecidia and teleuto-sori.

10. **Puccinia gerbericola** n. sp.

III. Teleuto-sori amphigenous, mostly hypophyllous, on obscure yellowish or brown leaf-spots, black-brown, pulverulent, surrounded by the torn epidermis, minute, usually in small groups which become confluent, forming larger sori, irregular in shape and up to 2 mm. diam. Teleutospores golden-brown, elliptical, oval or sub-globose, rounded at the base, usually obtusely acuminate, less frequently rounded at the apex, which is almost hyaline, slightly constricted at the septum, 33–44 × 20–25 μ; epispore, 3–3·5 μ thick, smooth, thickened at the apex (up to 10 μ); germ pores apical and just below the septum; pedicel stout, coloured, straight or flexuous, 6·5–7 μ thick just below the spore and tapering gradually to the base, up to 120 μ long.



Puccinia gerbericola.
Teleutospores.

Host: On living leaves of ? Gerbera sp. Garstfontein, Pretoria District, 14.5.13, Pienaar [6661].

This species differs from P. Gerberae chiefly in the thicker epispore and long pedicel.

Helichrysum Gaertn.

11. **Puccinia Kalchbrenneri** De Toni.

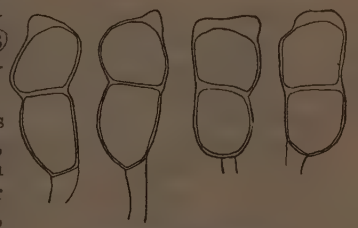
in Sacc. Syll. Fung. VII, p. 645; Syd. Monogr. Ured. I, p. 93; Pole Evans, Trans. Roy. Soc. South Africa V, pp. 641–642.

Syn. *Puccinia Helichrysi* Kalch. et Cke. Grev. IX, p. 21.

Uredo Lepisclinis Thuem. in Mycoth. univ. No. 1644.

II. Uredo-sori mostly hypophyllous, on indefinite yellowish-brown leaf-spots, which vary in colour and size and often become confluent, scattered or more or less grouped, minute, up to 0·5 mm. diam., at first compact, covered, convex, later rupturing the epidermis and becoming ochraceous, pulverulent. Uredospores yellowish in the mass, individually sub-hyaline, sub-globose, obovoid or ellipsoid, 20–23 × 19–27 μ; epispore rather delicate, minutely echinulate, contents granular.

III. Teleuto-sori hypophyllous, on the same spots as the uredo-sori and often interspersed with them, minute, dark brown, scattered or in close groups which are often limited by the leaf veins, compact, smaller than the uredo-sori. Teleutospores pale fuscous, except at the apices, cylindrical, ellipsoid or sub-clavate, 40–73 × 15–23 μ, rarely up to 27 μ broad,



Puccinia Kalchbrenneri.
Teleutospores.

the majority being 40–57 × 15–22 μ, constricted at the septum, usually attenuate towards the base, at the apex rounded, truncate or bluntly acuminate and then often oblique; epispore smooth, delicate, thin, pale except at the apex where it is thickened (up to 10 μ) and chestnut-brown; germ pores rather obscure, in the upper cell apical, and in the lower cell just below the septum; pedicel short, deciduous, slightly coloured, often inserted somewhat obliquely.

X. Mesospores rare, ellipsoid, straight or somewhat curved, thickened at the apex, 36–47 × 20 μ.

Hosts: Helichrysum quinquenerve Less., on leaves, Barberton, 4.2.11 and 29.8.11, Pole Evans [1158, 1860]; Eshowe, Zululand, 30.1.12, Pole Evans [2026]; Entumeni, Zululand, June, 1916, Haygarth [14170].

Helichrysum leiopodium Less. var. denudatum, Paardeplaats, Lydenburg District, 2.5.11, Pienaar [1491]; Leeuwpoort, Carolina District, 22.12.07, Burtt Davy [456]; Belfast, Transvaal, February, 1909 [554].

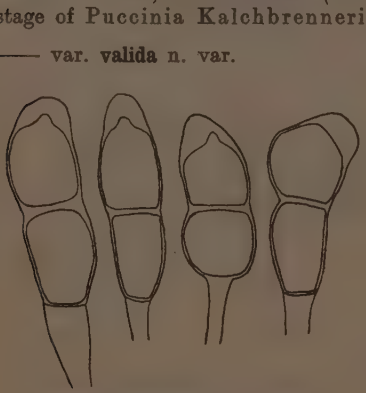
Helichrysum nudifolium Less. Boschberg, Cape Province, 1876, MacOwan 1239.

Distribution: South and Central Africa.

In South Africa it has been collected a number of times, chiefly in the Transvaal and Zululand. In addition to the hosts mentioned above this rust has been recorded on H. globosum and H. nudifolium (Syd. *loc. cit.*)

In No. 456, an Aecidium (see Ae. Helichrysi) is associated with the uredostage of Puccinia Kalchbrenneri.

—— var. **valida** n. var.



Puccinia Kalchbrenneri var. *valida*. Teleutospores.

II. Uredospores as in type.

III. Teleutospores, similar in form to those of type, but the majority are larger, 50–80 × 18–24 μ; the apex is deep chestnut-brown and more strongly thickened (up to 13 μ).

Hosts: Helichrysum coriaceum Sond., Garstfontein, Pretoria District, 13.4.11, 15.1.12, 1.4.15, Erasmus [1430, 2082, 9052].

Helichrysum leiopodium Dc., Pretoria, May, 1909, Doidge [683]; Garstfontein, Pretoria District, 26.3.11, 8.4.11, Pienaar [1269, 1421].

Helichrysum spp. undet., Lydenburg District, 25.1.11 and 2.5.11, Pienaar [1072, 1492].

Distribution: Transvaal.

Both type and variety differ from P. MacOwani in the strongly thickened, often truncate or oblique, deep brown apices of the teleutospores, and the somewhat coloured pedicels. P. MacOwani has teleutospores with almost hyaline apices and hyaline persistent pedicels.

There appears to be considerable confusion with regard to the type specimen of P. Helichrysi which is now P. Kalchbrenneri. The type should be Wood No. 35 on Helichrysum petiolatum. Our specimen under that number is only an Aecidium on a Helichrysum labelled H. petiolatum, but certainly not that species. The Kew specimen "35 ex Herb. Kalchbrenner" is Puccinia Gerberae on Gerbera Kraussii.

Through the courtesy of the Director I have been able to examine the material in Kew Herbarium and have compared this with the collections of Medley Wood and MacOwan at Pretoria; the result may be indicated as follows:—

Number.	Kew.	National Herbarium.
Wood 35.....	Puccinia Gerberae on Gerbera Kraussii	Aecidium on Helichrysum.
„ 592.....	P. Helichrysi on Helichrysum latifolium	Aecidium on H. latifolium.
„ 632.....	P. Gerberae on G. Kraussii.	P. Gerberae on G. Kraussii.
„ 633.....	P. Kalchbrenneri on Helichrysum pannosum	Aecidium on Helichrysum sp.
MacOwan 73.....	Aecidium on H. petiolatum. Probably = P. MacOwani	—
Wood 66.....	—	Type of Aecidium crypticum, also teleuto-sori of P. Gerberae.

The rust described above appears to be the one described by Sydow in his Monograph as Puccinia Kalchbrenneri. It is very probably that Aecidium Helichrysi is the aecidial stage of this fungus, but further evidence is needed.

12. **Puccinia MacOwani** Wint.

in Hedwigia 1885, p. 255; Syd. Monogr. Ured. I, p. 93; Pole Evans, Trans. Roy. Soc., South Africa V, p. 642.

O. Spermogones epiphyllous in small groups, opposite the aecidia, at first honey-yellow then brown.

I. Aecidia hypophyllous, on round or irregular leaf-spots, which are yellow or brown and often confluent, solitary or in groups of 2–12, yellowish-white, at first closed, later open up to 1 mm. long; margin of the peridium erect, incised, cells of the peridium rhomboid, 50–70 μ long, outer wall striate, 6–8 μ thick, inner minutely verruculose, 5–6 μ thick. Aecidispores angular-globose, sub-hyaline, 23–32 μ diam., epispore about 1·5 μ thick, finely and closely verruculose.

III. Teleuto-sori hypophyllous, often mingled with the aecidia or on similar spots, scattered or in small groups, round, minute, 0·5–1 mm. diam., pulverulent, fuscous. Teleutospores elongated, sub-clavate or broadly fusiform, attenuated towards both ends, slightly constricted at the septum, apex rounded, almost hyaline, brown, 60–90 × 19–25 μ; epispore smooth, thin, strongly thickened at the apex (up to 9 μ); pedicel thick, persistent, hyaline, equalling the spore in length or shorter.

Puccinia MacOwani.
Teleutospores.

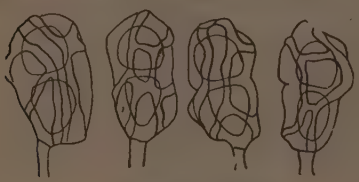
Host: Helichrysum petiolatum Dc., Boschberg Mountains, near Somerset East, July, 1877, MacOwan, Rabh. Wint. Fung. Eur. 3211, 3212 [3551, 3552].

13. **Puccinia Pienaarii**, Pole Evans.

in Trans. Roy. Soc., South Africa V, 1916, p. 643.

I. Aecidia amphigenous, scattered, interspersed with the teleuto-sori, solitary or in small groups, nestling among the leaf-hairs, minute, pale yellow, cupulate, 240–280 μ diam.; margin of the peridium yellowish-white, laciniate; cells of the peridium rather loosely connected, sub-rhomboid to oblong, 33–43 × 15–25 μ, outer wall striate, 5–6 μ thick, inner wall verruculose, 3–4 μ thick. Aecidiospores pale, almost hyaline, angular globose or ellipsoid, 21–30 × 15–23 μ, epispore about 1 μ thick, minutely verruculose, contents granular.

III. Teleuto-sori amphigenous, not on leaf-spots, scattered or in small groups, at first covered by the tomentose leaf-hairs, later partially exposed, often developing in old aecidia, up to 1 mm. diam., brown. Teleutospores oblong or ellipsoid, usually very irregular in outline owing to the sculpturing of the epispore, rounded or truncate at the apex, usually rounded at the base, more or less constricted at the septum, 33–48 × 18–27 μ; epispore not thickened at the apex, up to 10 μ in thickness, with irregular longitudinal or reticulate ridges or flanges (these are only visible when the spore is dry); pedicel short, hyaline, deciduous, often inserted obliquely.



Puccinia Pienaarii.
Teleutospores.

X. Mesospores rare, ellipsoid, 33–37 × 23–25 μ, epispore similar to that of teleutospores.

Hosts: Helichrysum sp. I, III, Paardeplaats, Lydenburg District, 2.4.11, Pienaar [1489].

Helichrysum floccosum Klatt, Natal, without date or locality [10980].

Distribution: Transvaal, Natal.

Characterised by the thick, heavy ridges on the epispore, which cause the wet spore to appear irregular in outline.

Hypochoeris Linn.

14. **Puccinia Hypochoeridis** Oud.

in Nederl. Kruidk. Archief II, Ser. I, p. 175; Syd Monogr. Ured. I, 100; Pole Evans, Trans. Roy. Soc., South Africa V, p. 644.

Syn. *Uredo Hyoseridis* Schum. Pl. Saell. II, p. 233 (1801).

II. Uredo-sori amphigenous or often caulicolous, scattered, pulverulent, often on small spots, cinnamon-brown, the primary sori up to 1·5 mm. diam., larger than the secondary sori, which are minute. Uredospores globose to ellipsoid, 22–28 μ diam., epispore echinulate, pale brown with two germ pores.

Puccinia Hypochoeridis.
Teleutospores.

III. Teleuto-sori amphigenous scattered, or often caulicolous, minute, punctiform, or up to 1 mm. diam., dark brown, pulvinate, surrounded by the torn epidermis. Teleutospores oval or ellipsoid, rounded at the apex, rounded or rarely attenuate at the base, slightly or not constricted at the septum, 30–46 × 16–24 μ; epispore thin, minutely verruculose, not thickened at the apex; germ pores conspicuous in upper cell, apical or more frequently about one-third of the distance from the apex to the medial septum; in lower cell lateral, not usually just below septum; pedicel short hyaline.

Host: Hypochoeris radicata L., Newlands, Capetown, 12.11.12, Pearson, [595].

Distribution: South Africa, Europe, Siberia, North America, Chili, Australia, New Zealand.

This species is only represented in the National Herbarium by the single collection mentioned above; only teleutospores are present, the uredo-spores having been studied from exotic exsiccata.

The host is an introduced weed.

Nidorella Cass.

15. **Puccinia aecidiiformis** Thuem.

in Flora, 1875, p. 378, et 1880, p. 318; Syd. Monogr. Ured. I, p. 128; Pole Evans, Trans. Roy. Soc., South Africa V, p 644.

III. Teleuto-sori hypophyllous and caulicolous, sometimes becoming amphigenous, on yellow leaf-spots, in habit very closely resembling an Aecidium, minute, developing centrifugally and forming by confluence compact, yellow, pulvinate groups about 2 mm. diam. Teleutospores very pale, yellowish, almost hyaline, oblong to ellipsoid, slightly constricted at the septum, upper cell rounded or tapering to the apex, lower cell usually rather longer than the upper and tapering towards the base, 52–75 × 20–28 μ; epispore thin, smooth, thickened at the apex (up to 8 μ); germ pore in the upper cell obscure; pedicel hyaline, deciduous, up to 70 μ long.

Puccinia aecidiiformis.
Teleutospores.

Host: Nidorella mespilifolia DC., on living leaves, in woods, Boschberg Mountains, Somerset East, Cape Province, Autumn, 1875, MacOwan, Crypt. Austro-Afric. 1105 [8845]; Rabh. Fung. Eur. 3611 [3951]; near Umgeni Lagoon, Durban, 21.3.10, Doidge [855].

Distribution: South Africa, coastal districts.

Characterized by the aecidium-like appearance of the teleuto-sori. The host is a half-climbing or scrambling plant which occurs commonly in the coastal areas from the south-west to Natal.

Othonna Linn.

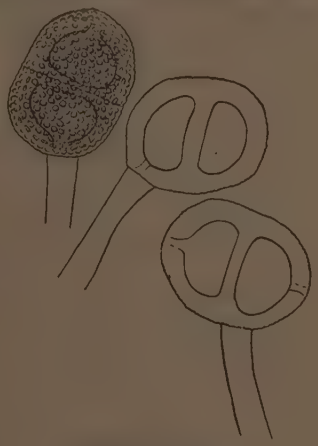
16. **Puccinia Othonnae** n. sp.

III. Teleuto-sori amphigenous, scattered, minute, black, pulverulent, often becoming confluent, single sori up to 1 mm. diam. Teleutospores chestnut-brown, broadly oval, broadly rounded at both ends, not constricted at the septum, 43–50 × 33–40 μ; epispore 6·5–8 μ thick, verrucose, not thickened at the apex, germ pores obscure; pedicel hyaline, persistent, about 10 μ thick and up to 150 μ long, often inserted obliquely.

Host: Othonna natalensis Sch. Bp., Olifantsfontein, Transvaal, 14.4.20, Pienaar [13052]; Roodepoort, Transvaal, 4.6.19, Pole Evans [14184].

Distribution: Transvaal.

The genus Othonna is an African one with 100 species widely distributed in South Africa.



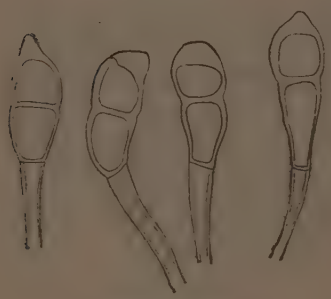
Puccinia Othonnae.
Teleutospores.

Printzia Cass.

17. **Puccinia Printziae** Thuem.

in Myc. univ. n. 742 : Syd. Monogr. Ured. I, p. 137 ; Pole Evans, Trans. Roy. Soc. South Africa V, p. 644.

III. Teleuto-sori on yellow-brown leaf-spots, usually developing first in the centre of the spot and then round the circumference, chestnut-brown, minute, pulvinate, often forming larger sori by confluence. Teleutospores very pale yellowish-brown, oblong, ellipsoid or subclavate, rounded or bluntly acuminate at the apex, attenuate towards the base, constricted at the septum, 40–65 × 16–22 μ, epispore thin, smooth, very much thickened at the apex (up to 10 μ); germ pores obscure; pedicel thick, hyaline, persistent, up to 55 μ long.



Puccinia Printziae.
Teleutospores.

Host: Printzia Huttoni Thuem., Somerset East, Cape Province, 1876, MacOwan, Crypt. Austro-Afric. 1278 [9846].

Distribution: South Africa.

This rust is only known from the single collection mentioned above; the host is a tall scrambling or half-climbing slender shrub, belonging to an endemic genus of seven species.

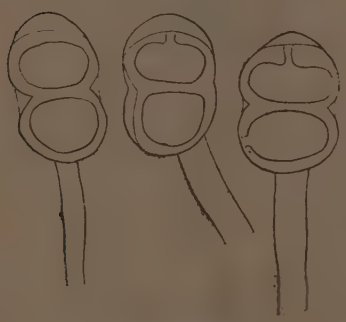
Senecio L. see also (Bothal 2:473) P. printzianum.

18. **Puccinia oedipus** Cke.

in Grevillea X, p. 126 ; Syd. Monogr. Ured. I, 143 ; Pole Evans, Trans. Roy. Soc. S. Afric. V, 645.

II. Uredo-sori hypophyllous, minute, scattered, fuscous; uredospores globose, yellow-brown, 30–38 μ diam., epispore about 3·5 μ thick, echinulate, and with two almost equatorial germ pores.

III. Teleuto-sori hypophyllous, scattered, minute, pulverulent, almost black, noticeably darker in colour than the uredo-sori; teleutospores broadly ellipsoid or oblong-ellipsoid, broadly rounded at both ends, slightly constricted at the septum, chestnut-brown, 50–54 × 27–35 μ; epispore smooth 3–3·5 μ thick, thickened at the apex, which is, much paler (up to 11 μ); pedicel hyaline, persistent, thick, sometimes flexuous, up to 90 μ long, often inserted obliquely.



Puccinia oedipus.
Teleutospores.

Host: On living leaves of Senecio panduri-folius Harv. Inanda, Natal, May, 1881, Medley Wood 561 [369 and 10491].

Distribution: South Africa.

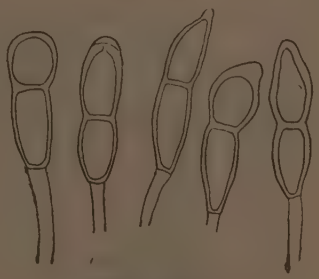
This fungus is known only from the single collection made by Medley Wood in Natal.

Spilanthes Jacq.

19. **Puccinia africana** Cke.

in Grevillea VIII, p. 71 (1879); Syd. Monogr. Ured. I, 156; Pole Evans, Trans. Roy. Soc. S. Afr. V, 645.

III. Teleuto-sori hypophyllous, on small brown spots, scattered or circinate, minute, compact, dark brown, almost black. Teleutospores clavate or fusiform, rounded or narrowed at the apex and tapering towards the base; constricted at the septum, 43–58 × 14–19 μ; epispore, smooth, about 3 μ thick, thickened at the apex up to 8 μ; germ pore apical, obscure in the lower cell. Teleutospores yellow-brown in the upper half, becoming almost hyaline towards the base; pedicel hyaline, persistent, shorter than the spore.



Puccinia africana.
Teleutospores.

Hosts: Spilanthes africana DC., on living leaves, Inanda, Natal, Medley Wood 200 [11162].

Spilanthes acmella L., Kentani, Cape Province, 19.11.12, Pegler [7088].

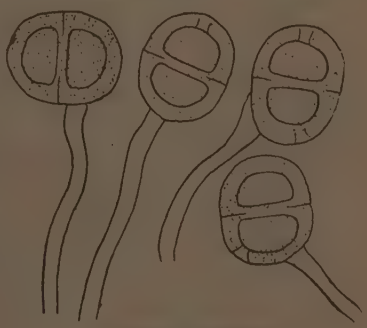
Distribution: Abyssinia, tropical and South Africa, Madagascar. The genus Spilanthes comprises annual and perennial herbs, which are mostly tropical.

Vernonia Schreb.

20. **Puccinia Koedoeënsis n. sp.**

II. Uredo amphigenous, scattered, on minute purplish leaf-spots, bullate, round, or elongated if near a vein, up to 1 mm. diam., reddish-brown, pulverulent. Uredospores oval to ellipsoid, yellow-brown, minutely echinulate, 30–40 × 16–27 μ.

III. Teleuto-sori amphigenous, minute, scattered, not on leaf-spots, black, round or angular, pulverulent, surrounded by the torn epidermis. Teleutospores broadly oval to sub-globose, chestnut-brown, broadly rounded at both ends, not constricted at the septum, 30–44 × 15–33 μ, cells similar in form and size; epispore very thick, 5–6·5 μ, minutely verrucose; germ pore in the upper cell apical, in the lower cell near the base, just to one side of the pedicel; pedicel hyaline, persistent, long, flexuous, up to 120 μ long, often inserted obliquely or transversely.



Puccinia Koedoeënsis.
Teleutospores.

Host: Vernonia monocephala Har. Koodoospoort, Pretoria District, 31.3.16, Pole Evans [9686]; Kaalfontein, Transvaal, Mogg [11652]; Olifantsfontein, Transvaal, 4.4.20, Pienaar [13018]; Paardeplaats, Lydenburg District, 2.5.11, Pienaar [1501].

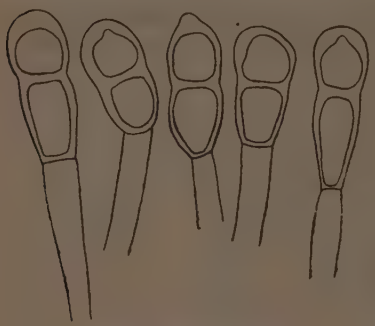
Distribution: Transvaal.

The host is an indigenous perennial herb.

21. **Puccinia inflorescenticola** Pole Evans.

in Trans. Roy. Soc. S. Africa V, 646.

III. Teleuto-sori developed on the inflorescence, causing considerable hypertrophy and malformation of the pedicels; sori on gall-like growths, often 3–4 mm. thick and 3–4 cm. long, forming by confluence a dark brown, almost black, layer, interrupted only by torn fragments of the cortex. Teleutospores oblong, ellipsoid, cylindrical, or clavate, the 2 cells separating very readily at the medial septum; golden-brown, contents granular, rounded or less frequently tapering somewhat at the apex; in the clavate spores the lower cell is considerably longer than the upper, in ellipsoid and cylindrical forms the cells are more or less equal, the two types merging into one another by almost imperceptible gradations, 36–65 × 20–24 μ, the majority being 40–45 × 20–22 μ; epispore smooth, rather thin, thickened at apex up to 9 μ; germ pore in the upper cell apical, in lower cell obscure; pedicel coloured, rather stout, up to 90 μ long.



Puccinia inflorescenticola.
Teleutospores.

Host: Vernonia corymbosa Less., on the inflorescence, Rosehaugh, Transvaal, 3.6.14, T. R. Sim [7802].

Distribution: Transvaal.

The host is a large indigenous shrub; there is only one record of the occurrence of the fungus.

22. **Puccinia vernoniicola** P. Henn.

in Engl. Ostafrikan, Pflanzenwelt, p. 50 (1895); Syd. Monogr. Ured. I, 177; Pole Evans, Trans. Roy. Soc. South Africa V, 646.

III. Teleuto-sori hypophyllous, on more or less distinct yellowish or brown leaf-spots, scattered, round-irregular in outline, ochraceous, pulvinate, usually 2–3 mm. diam., but sometimes up to 5 mm. Teleutospores very pale yellow, almost hyaline, clavate, straight or somewhat curved, rounded at the apex, upper cell usually shorter, 33–73 × 20–27 μ; the majority are over 60 μ long and 20–23 μ broad; 3-celled spores occur; epispore smooth, extremely thin, and only slightly thickened at the apex; germ pore apical in the upper cell, and in the lower cell just below the septum; pedicel hyaline, persistent, up to 50 μ long, usually shorter than the spore.

Puccinia vernoniicola.
Teleutospores and one mesopore.

Host: Vernonia angulifolia DC., on living leaves, Table Mt.; Natal, 18.5.11, Fuller [1618]; Winkle Spruit, Natal, 6.7.12, Doidge [2498].

Distribution: Tropical East Africa and South Africa; originally described on Vernonia sp. collected at Marangu in East Africa. Sydow's description gives the pedicel up to 100 μ long and the epispore not thickened at the apex. The South African specimens vary somewhat in having a shorter pedicel and a slightly thickened apex.

Species parasitic on the **Cucurbitaceae.**

23. Puccinia Cephalandrae Thuem.

in Flora 1876, p. 425; Syd. Monogr. Ured. I, p. 198.

Syn. *Uredo Cephalandrae* Thuem. *loc. cit.*

U. dolichospora Kalch. mscr.

Puccinia Momordicae Kalch. et Cke. in Grevillea VIII, p. 71 and XI, p. 24; Syd. Monogr. Ured. I, p. 200.

P. Trochomeriae Cke. in Grevillea X, p. 125; Syd. Monogr. Ured. I, p. 200, Ann. Myc. XX, 1922, p. 60.

Aecidium Cephalandrae Cke. in Grevillea XIII, p. 6.

O. Spermogones epiphyllous, crowded in small groups, honey-yellow, 100–140 μ diam.

I. Aecidia hypophyllous, sometimes becoming amphigenous, on round brown leaf-spots, 1–5 mm. diam., causing a certain amount of hypertrophy when occurring on veins or petioles, in closely-crowded circular groups, minute, yellowish-white, cupulate, 240–300 μ diam.; margin of the peridium white, recurved, fimbriate cells of the peridium firmly joined together, sub-rhomboid to polygonal, 40–50 × 16–20 μ, imbricate, outer wall striate, 5–6 μ thick, inner verruculose, 4–5 μ thick. Aecidiospores sub-hyaline or yellowish, globose ellipsoid or pyriform, 20–33 × 16–23 μ; epispore about 1·5 μ thick, densely verruculose.

Puccinia Cephalandrae.
Teleutospores.
A. From type specimen of *P. Momordicae.*
B. From type specimen of *P. Trochomeriae.*
C. *P. Cephalandrae.*

II. Uredo-sori hypophyllous, scattered, round, usually minute, rusty-brown, soon becoming naked, surrounded by the torn epidermis, pulverulent. Uredospores ellipsoid, fusoid or pyriform, pale fuscous, 33–53 × 16–20 μ; epispore thin, yellowish, finely echinulate, with 2 prominent equatorial germ pores.

III. Teleuto-sori hypophyllous, not causing leaf-spots, minute or up to 1 mm. diam., round, pulverulent, dark brown, surrounded by the torn epidermis. Teleutospores sub-globose, oval or ellipsoid, slightly constricted at the septum, rounded at the base, rounded or apiculate at the apex, chestnut brown, 30–54 × 20–30 μ (the length includes the apicule), apicule absent or up to 10 μ long; epispore 3–3·5 μ thick, with rather fine, irregular, bent or flexuous ridges; germ pores obscure; pedicel hyaline, persistent, up to 85 μ long, 6·5–8 μ thick just below the spore, narrower below.

X. Mesospores not numerous, oval, apiculate, 35–37 × 26–27 μ.

Hosts: Cephalandra quinqueloba Sch., on leaves, Boschberg Mountains, Cape Province, 1875, MacOwan [1146]; I, III, Garstfontein, Pretoria District, 30.3.12, Pole Evans [2207]; II, Amalinda, East London, 5.3.12, Pienaar [2176]; O, I, II, van Stadens Pass, Cape Province, 13.11.17, Doidge [10863]; I, III, East London, 24.11.17, Doidge [10899]; III, Pirie Forest, Kingwilliamstown, 8.7.19, Doidge [12264].

Cephalandra palmata, Cogn., I, Natal, 17.4.1895, Medley Wood [370]; III, Maritzburg, Natal, 6.4.14, Doidge [8249].

Cephalandra sessilifolia Sond., II, III, Potgietersrust, 12.4.06, Pole Evans [132].

Coccinia indica Wt., O, I, II, III, Duivelskloof, Northern Transvaal, 11.1.25, Doidge [20343].

Cucumis sp., III, Natal, 1917, Pole Evans [10982].

Kedrostis punctulata Cogn., Bloemfontein, Orange Free State, 13.4.17, Potts [11301].

Momordica cordifolia Sond., III, Inanda, Natal, Medley Wood 141 (= P. Momordicae Kalch, et Cke., *loc. cit.*) [11163, 10471].

Trochomeria sagittata Benth. et Hk., Inanda, Natal, Medley Wood 594 (= P. Trochomeriae Cke., *loc. cit.*) [10513].

Zehneria scabra Sond., I and III, Entumeni, Zululand, June, 1916, Haygarth [14194 and 14188]; II and III, van Stadens Pass, Cape Province, 19.5.23, Doidge [17247].

Distribution: South Africa.

Originally described on leaves and fruits of Cephalandra palmata and C. quinqueloba near Somerset East (MacOwan) and Durban (Medley Wood). It has since been collected on various hosts in Natal, the eastern part of the Cape Province, and Zululand, and occurs also in the Transvaal and the Free State.

The teleutospores are very variable in size and in the presence or absence of the apicule. Nos. 12264, 14194, 132 have a typical apicule, usually 3–10 μ long, but sometimes only 1·5 μ; a second group, including Nos. 8249, 2207, and Medley Wood's type collections of Puccinia momordicae Kalch. et Cke. and P. Trochomeriae Cke. have usually a short apicule, not more than 3·5 μ long; in a third section (Nos. 10899, 11301 and 10982), the teleutospores are rarely apiculate. This variation has no relation to the species of the host, all three forms may be found on Cephalandra quinqueloba, and all show the peculiar irregular flexuous and tortuous ridging of the epispore characteristic of P. Cephalandrae. This shows very plainly when the spores are dry. I think there can be no doubt that P. Momordicae and P. Trochomeriae are identical with P. Cephalandrae.

Species parasitic on **Rubiaceae.**

Anthospermum L.

24. **Puccinia Anthospermi** Syd.

in Monogr. Ured. I, p. 206–207.

III. Teleuto-sori hypophyllous, on minute, grey-brown leaf-spots, about 2 mm. diam., minute, round, in small groups, which become confluent, compact, cinnamon-brown. Teleutospores oblong, rounded at the apex and not or slightly thickened, or conically attenuate and then thickened up to 9 μ, deeply constricted at the septum, usually attenuate, rarely rounded at the base, smooth, yellow, 35–46 × 16–21 μ, epispore thin; pedicel hyaline, up to 30 μ long.

Hosts: Anthospermum hirtum Cruse., on leaves, Cape of Good Hope (Sieber).

This rust is not represented in the National Herbarium, the above description being taken from Sydow (*loc. cit.*). He remarks: " Leider sahen wir wenige Sporenhaufchen, so dass die obige Beschreibung, namentlich die des Habitus, vielleicht später noch etwas zu modifizieren resp. zu erweitern ist."

The species is insufficiently known.

Galium L.

25. **Puccinia punctata** Link.

Obs. Mycol. II, p. 30, in Magaz. naturf. Freunde. Berlin (1816), Sy d.Monogr. Ured. I, p. 213.

Syn. *Dicaeoma punctata* Arth. Proc. Ind. Acad. Sci., 1903, p. 150.

For complete synonymy, see Sydow *loc. cit.*

O. Spermogones amphigenous, in small clusters, honey coloured.

I. Aecidia hypophyllous, scattered or in round groups on round or oblong, paler leaf-spots, shortly cylindrical, with a short white recurved margin. Aecidiospores globose or broadly ellipsoid, orange-yellow, somewhat smooth, 16–23 μ diam.

II. Uredo-sori hypophyllous, minute, round to irregular, linear on the stems, reddish-brown, often confluent. Uredospores globose to ovate, aculeolate, pale brown, 22–30 × 17–23 μ, with two or three germ pores.

[III. Teleuto-sori hypophyllous, oblong to sub-orbicular, black compact. Teleutospores ellipsoid to clavate, truncate, rounded or conically attenuate at the apex, where they are much thickened (up to 14 μ) and often darker, slightly constricted at the septum, tapering towards the pedicel, brown, smooth, 30–56 × 14-24 μ; pedicels brownish above persistent, thick, about as long as the spore.]

Hosts: Galium capense Thun., O. I, II, Bloemfontein, November, 1915, Potts [9757].

There are no teleuto-sori on this material, but the rust must very probably be assigned to Puccinia punctata Link.

Distribution: South Africa, Europe, Siberia, North America, Chili.

Galopina Thunb.

26. **Puccinia Galopinae** Cke.

in Grevillea X, p. 124; Syd. Monogr. Ured. I, p. 220.

III. Teleuto-sori hypophyllous on small round brown leaf-spots, about 2 mm. diam., scattered or in groups, minute, round, compact, purplish brown. Teleutospores oblong or oblong clavate, apex conically attenuate, rounded or truncate, thickened up to 7 μ, constricted at the septum, attenuate at the base, smooth, pale yellow, 35–50 × 11–15 μ; epispore thin, smooth; germ pores obscure, apical in the upper cell and just below the septum in the lower, pedicel hyaline, thin, up to 70 μ long.

Puccinia Galopinae. Teleutospores.

Hosts: on leaves of Galopina aspera Sond., Inanda, Natal, June, 1881, Medley Wood 602 [9551, 10474, 11192].

Distribution: Natal.

The above is part of the original collection; the fungus has also been recorded on Galopina circaeoides (Syd. *loc. cit.*).

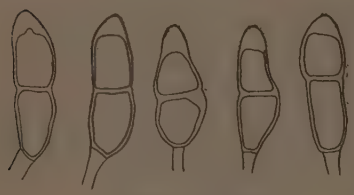
Distribution: South Africa.

The genus Galopina is endemic.

Oldenlandia L.

27. **Puccinia Woodiana** n. sp.

III. Teleuto-sori hypophyllous on small brown leaf-spots, scattered or in small groups and becoming confluent, up to 1·5 mm. diam., pulvinate, compact, yellow to yellowish brown. Teleutospores, ellipsoid or sub-clavate, conically attenuate or somewhat rounded at the apex, slightly attenuate, rarely rounded at the base, constricted at the septum, pale yellow, almost hyaline, 33–44 × 13–17 μ; epispore smooth, about 1·5 μ thick, very much thickened (up to 7 μ) at the apex; germ pore apical in the upper cell, obscure in the lower; pedicel concolorous with the spore, almost hyaline, persistent, up to 45 μ long.



Puccinia Woodiana.
Teleutospores.

Hosts: Oldenlandia natalensis Hochst., on leaves, Town Bush Valley, Maritzburg, Natal, 7.4.11, Pole Evans [1409]; Maritzburg, Natal, 11.5.11, Fuller [1540]; near Clydesdale, Umzimkulu, Griqualand East, February, 1885, Tyson, 2108 [20243].

Distribution: Natal and Griqualand East.

Oldenlandia is a tropical genus with thirty-nine South African species.

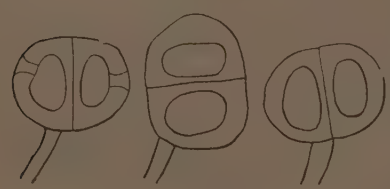
Pentanisia Harv.

28. **Puccinia Pentanisiae** Cke.

in Grevillea X, p. 125; Syd. Monogr. Ured. I, p. 224.

II. Uredo-sori, scattered, minute, round, pulverulent, brown; uredospores globose, sub-globose or ovate, aculeate, light brown, 20–33 μ diam.

III. Teleuto-sori hypophyllous, scattered or in groups, frequently confluent, minute, pulverulent, surrounded by the torn epidermis, black. Teleutospores broadly ellipsoid or sub-globose, broadly rounded at both ends, not constricted at the septum or very slightly so, chestnut-brown, 32–50 × 24–35 μ; epispore smooth, 6–7 μ thick, not thickened at the apex; germ pores obscure, apical in the upper cell and basal or slightly oblique in the lower; pedicel short, hyaline, often inserted obliquely or transversely.



Puccinia Pentanisiae.
Teleutospores.

X. Mesospores not numerous, sub-globose, 26–30 μ diam.

Hosts: Pentanisia variabilis Harv., on leaves, Inanda, Natal, June, 1881, Medley Wood, 536, 567, and 596 [10495, 831, 10494, 10496]; Witbank, Transvaal, 4.2.11, Walters [1195]; Garstfontein, Pretoria District, 2.5.11, Pienaar [1488]; Kaalfontein, Pretoria District, 9.3.16, Pole Evans [9541]; Henley, near Maritzburg, Natal, 24.5.15, Doidge [9091]; New Hanover, Natal, 24.3.17, Van der Bijl [10117]; Olifantsfontein, Transvaal, 4.4.20, Pienaar [13017].

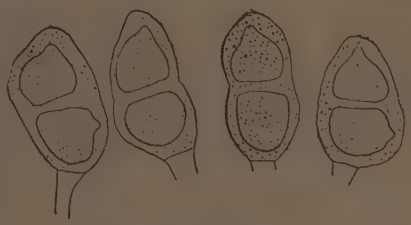
Distribution: South Africa.

The original collection was by Medley Wood at Inanda in Natal, June, 1881.

Pentanisia is an African genus, with two South African species.

29. **Puccinia pretoriensis** n. sp.

III. Teleuto-sori amphigenous on minute purplish leaf-spots, minute, almost black, scattered or crowded and becoming confluent, pulverulent, surrounded by the white raised torn epidermis. Teleutospores golden-brown, ellipsoid, sub-globose or obovate, rounded or bluntly or conically attenuated at the apex, attenuate or rounded at the base, usually slightly constricted at the septum, rather irregular in form and often asymmetrical, 33–53 × 20–30 μ; epispore 3–3·5 μ thick, minutely verruculose, thickened at the apex (up to 7 μ); germ pores conspicuous, apical in the upper cell, and lateral in the lower, at a point about one-third to one-half of the distance between the septum and the base; pedicel short, hyaline, deciduous.



Puccinia pretoriensis.
Teleutospores.

Host: Pentanisia variabilis Harv., on leaves, Garstfontein, Pretoria District, 14.5.13, Pienaar, [6663].

This species is quite distinct from Puccinia Pentanisiae Cke.

Rubia L.

30. **Puccinia dimorpha** Syd.

in Monogr. Ured. I, p. 227.

Syn. *Puccinia Rubiae* Kalch. et Cke. in Herb. (?).

II. Uredo-sori hypophyllous, scattered or in groups, minute, brown, round or irregular, surrounded by the torn epidermis. Uredospores sub-globose, oval or pyriform, chestnut-brown, 26–34 × 23–26 μ; epispore rather thin, about 1·5–2 μ, moderately echinulate, and with 3 equatorial germ pores.

III. Teleuto-sori are of two kinds; on the leaves they are hypophyllous or more rarely amphigenous, scattered or circinate, 1–2 mm. diam., soon becoming naked, dark brown; on the stem they are oblong or elongated, raised, cushion-like, thicker, and the stem is often deformed and thickened. Teleutospores clavate, apex rounded or bluntly acute, attenuate towards the base, constricted at the septum, pale, fuscous, darker near the apex, 45–75 × 20–27 μ; upper cell sub-globose or rarely ellipsoid, 20–27 μ wide, lower cuneate 19–23 μ wide, cells readily becoming separated; epispore smooth, rather thin (1·5–2 μ), strongly thickened at the apex (up to 14 μ); germ pore apical in the upper cell and in the lower just below the septum; pedicel hyaline, stout up to 68 μ long.

Puccinia dimorpha.
Teleutospores.

Hosts: Rubia petiolaris DC., on leaves and stems, Wonderboom, Pretoria District, 13.5.11, Pole Evans [1494]; Hennops River, Pretoria District, 28.1.12, Doidge [2035]; Hennops River, 27.4.12, Pole Evans [2272]; Maritzburg, Natal, 6.4.14, Doidge [8251].

Rubia petiolaris DC. var. heterophylla, Wonderboom, Pretoria District, 15.5.11, Pole Evans [1495].

Rubia cordifolia L., Umgeni Beach, Durban, 7.7.12, Doidge [2526]; Kentani, Cape Province, 11.1.16, Pegler, 2385 [9427].

Distribution: South Africa.

Originally described on leaves and stems of Rubia petiolaris collected by MacOwan near the Boschberg. Sydow describes only the teleutospores; on most of the material in the National Herbarium, uredospores are also present.

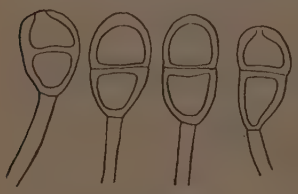
The hosts are two of the three indigenous species of Rubia.

Spermacoce Mey.

31. **Puccinia bakoyana** Pat. et Har.

in Jour. de Bot., 1900, p. 237; Syd. Monogr. Ured. I, p. 228.

III. Teleuto-sori hypophyllous or caulicolous, scattered or in small round groups, 2–3 mm. diam., on brown leaf-spots, minute, round, compact, dark brown. Teleutospores brown, ellipsoid, ovate or globose, apex rounded, base rounded or attenuate, not constricted or slightly so, 20–40 × 16–23 μ; epispore smooth, 2·5–3 μ thick, not thickened at the apex or very slightly so (up to 5 μ); germ pores apical and just below the septum, pedicel tinted brown at the apex, slender, persistent up to 100 μ long, sometimes very slightly obliquely inserted.



Puccinia bakoyana.
Teleutospores.

Host: Spermacoce dibrachiata Oliv., Salisbury, Rhodesia, February, 1920, Eyles [14005].

Distribution: Rhodesia and Tropical Africa.

The type collection came from Senegal. Spermacoce has two species indigenous to South Africa.

Vangueria Juss.

32. **Puccinia Vangueriae** Doidge n. sp.

III. Teleuto-sori hypophyllous, becoming amphigenous, on yellow leaf-spots, scattered or in small groups and becoming confluent, forming round-irregular sori, 2–6 mm. in diameter, for some time covered by the greyish epidermis, then becoming naked, pulvinate, compact, dark brown. Teleutospores chestnut-brown, globose, sub-globose or broadly ellipsoid, broadly rounded at both ends, not constricted at the septum or very slightly so, 24–35 × 17–24 μ; epispore smooth, about 3·5 μ thick, not thickened at the apex; germ pores obscure; pedicel hyaline, persistent, usually flexuous, up to 130 μ long, 6·5–10 μ broad near the spore and tapering downwards, often inserted obliquely or transversely.

Puccinia Vangueriae.
Teleutospores.

Host: Vangueria pygmaea Schl. on living leaves, Kaalfontein, Pretoria District, 2.2.16 and 24.1.17, Pole Evans [9437, 10042]; same locality, 22.2.18, Mogg [11656]; Olifantsfontein, Transvaal, 11.2.20, Pienaar [12817].

Distribution: Transvaal.

Species parasitic on **Acanthaceae.**

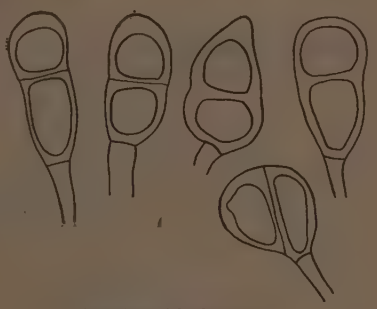
Blepharis Juss.

33. **Puccinia Blepharidis** P. Henn.

Botanische Ergebnisse der Kunene-Sambesi-Expedit., p. 2 (1902), Sydow. Monogr. Ured. I, p. 231.

O. Spermogones not seen.

I. Aecidia usually hypophyllous on indeterminate, yellow or fuscous leaf-spots, scattered or in small groups, cupulate, 270–350 μ diam ; margin of the peridium fimbriate ; cells of the peridium firmly joined together, rhomboid to polygonal, 16–20 × 10–16 μ, outer wall striate, 5–6 μ thick, inner verruculose 4–5 μ thick. Aecidiospores angular-globose, 15–22 × 12–19 μ ; epispore hyaline, about 1 μ thick, delicately verruculose.



Puccinia Blepharidis.
Teleutospores.

III. Teleuto-sori amphigenous, often epiphyllous, sometimes mixed with the aecidia, scattered or in small, irregular sub-orbicular groups, minute, long covered by the bullate epidermis, compact, dark brown. Teleutospores variable, ovate-oblong or oblong-clavate, rounded at the apex or rarely somewhat acute, not constricted at the septum or slightly so, rounded or attenuate at the base, smooth, brown, 35–58 × 18–28 μ ; epispore 3–3·5 μ thick, more or less thickened at the apex (5–11 μ), germ pores obscure, apical in the upper cell, and in the lower just below the septum ; pedicel brown, persistent, rather thick, equalling the spore in length. The teleutospores are very various in form and there is a strong tendency towards abnormal spore formation.

X. Mesospores not numerous, ellipsoid, about 30–34 × 20 μ.

Host : Blepharis Buchneri Lindau, on leaves, near Manonge, South West Africa, 33.4.1900, Baum [6885].

Distribution : South-West Africa.

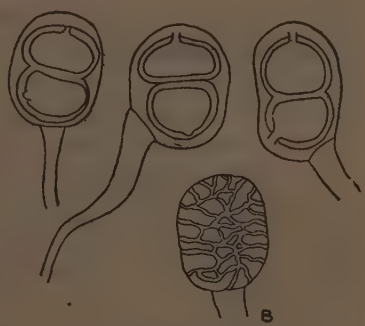
Only known from the type collection. The genus Blepharis is mostly African, but a few species extend to Arabia and India.

Chaetacanthus Nees.

Puccinia Chaetacanthi n. sp.

II. Uredospores mixed with the teleutospores, broadly ellipsoid, pyriform or irregular in shape, 30–37 × 23–27 μ ; epispore golden-brown, about 3 μ thick, echinulate, and with two equatorial germ pores.

III. Teleuto-sori amphigenous, mostly hypophyllous, black, raised, convex, round to irregular, and up to 1 mm. diam., long covered by the blistered epidermis, finally naked, pulverulent and surrounded by the torn fragments of the epidermis. Teleutospores sub-globose or broadly oval, often asymmetrical, broadly rounded at both ends, not constricted at the septum or very slightly so,



Puccinia Chaetacanthi.
Teleutospores.

B. One teleutospore mounted dry to show sculpturing of epispore.

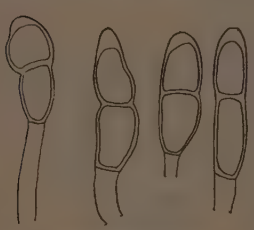
40–47 × 26–37 μ, chestnut-brown ; epispore 3–6 μ thick, not thickened at the apex ; when dry the epispore shows a net-work of grooves channelled in the thickness of the wall, which account for the irregularity in thickness ; germ pore apical in the upper cell, and in the lower cell about half-way between the septum and the base ; pedicel hyaline, persistent, straight or sinuous, up to 80 μ long, 10 μ thick near the spore and tapering towards the base, often inserted obliquely and occasionally transversely.

Host : Chaetacanthus glandulosus Nees., Roodekop, Elands River, Transvaal 8.5.21, Thomson [14697].

Distribution : Transvaal.

Isoglossa Oerst.

35. **Puccinia Isoglossae** n. sp.



Puccinia Isoglossae. Teleutospores.

III. Teleuto-sori hypophyllous, forming raised wart-like tubercles 1–3 mm. diam., often on yellowish-brown, indeterminate leaf-spots, sori compact, pulvinate, dark brown, 1–2 mm. diam. Teleutospores pale, fuscous, cylindrical to clavate, attenuate at base, rounded at the apex, constricted at the septum, 40–50 × 13–15 μ ; epispore thin, smooth, about 1 μ thick, thickened at the apex up to 5 μ ; germ pores obscure ; pedicel hyaline, persistent, up to 45 μ long and about 6 μ thick.

Hosts : Isoglossa ovata Nees, on leaves, Winkle Spruit, Natal, 5.6.12, Pole Evans [2399].

Isoglossa Woodii C.B.Cl., Claridge, Natal, 31.5.15, Doidge [9075].

Distribution : Natal.

Two aecidia occur on Isoglossa spp., but the connection between either of these and the teleuto-stage here described, has not been established. Aecidium Isoglossae Syd. (Ann. Myc. I, 903, p. 333), occurs on I. lactea in German East Africa ; this species produces its aecidia on raised wart-like tubercles which are similar to those on which the teleuto-sori of P. Isoglossae are found.

The second aecidium is Ae. Acanthacearum which causes no hypertrophy of the host and is found in the Transvaal ; it also has much smaller spores than A. Isoglossae.

Thunbergia Linn. f.

36. **Puccinia Thunbergiae** Cke.

in Grevillea X, p. 125 ; Sydow. Monogr. Ured. I, p. 238.

Syn. *Aecidium Thunbergiae* Cke. in Grevillea X, p. 125.

O. Spermogones not seen.

I. Aecidia amphigenous, usually hypophyllous, on pale spots, closely crowded in more or less circular groups, cupulate, 240–300 μ diam. ; margin of the peridium white, strongly revolute and irregularly laciniate ; cells of the peridium firmly joined together, imbricate, rhomboid, 25–35 × 13–17 μ, outer wall striate, 6–7 μ thick, inner verruculose 3–4 μ thick. Aecidiospores angular-globose or broadly ellipsoid, 16–19 μ diam. ; epispore very thin (less than 1 μ), hyaline, minutely verruculose, contents of spore orange-coloured.

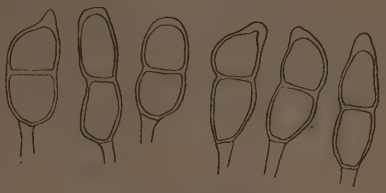
III. Teleuto-sori usually hypophyllous, frequently mixed with the aecidia, violet-brown. compact, up to 3 mm. diam. ; convex. Teleutospores varying greatly in size, subclavate or ellipsoid and elongated, rounded or sub-acute at the apex, slightly constricted at the septum, attenuate at the base, yellow-brown, 35–63 × 12–19 μ ; epispore

delicate, 1–1·3 μ thick, smooth, thickened at the apex up to 5·5 μ; germ pores obscure; pedicel thin, hyaline, up to 22 μ long.

Hosts: Thunbergia natalensis Hk. on leaves, I. Inanda, Natal, May, 1881, Medley Wood 468 [348, 11203, 10314]; III, Inanda, Natal, May, 1881, Medley Wood 576 [10511]; Maritzburg, Natal, 7.4.11, Pole Evans [1416].

Thunbergia atriplicifolia Lindau, near Woodbush, Transvaal, 9.1.25, Webber [20318].

Distribution: Transvaal and Natal.



Puccinia Thunbergiae.
Teleutospores.

No uredo-sori could be detected either in Medley Wood's original specimen nor on subsequent collections. Sydow (*loc. cit.*) quotes a description of uredospores from Sacc. Syll. Fung. VII, p. 615.

Species parasitic on the **Solanaceae.**

Lycium L.

37. **Puccinia afra** Wint.

in Hedwigia, 1887, p. 26; Syd. Monogr. Ured. I, p. 265.

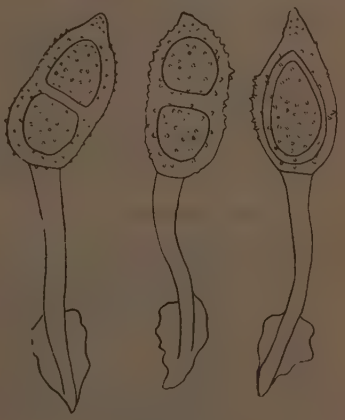
I. Aecidia most frequently closely crowded on sepals and peduncles, which are thickened and very much curved and distorted, sub-cylindrical, wide open, 500–600 μ diam.; margin of the peridium deeply incised, more or less recurved or sub-erect, pale yellow; cells of the peridium loosely connected, oblong to sub-rhomboid, often triangular in section with the apex pointing inwards, 40–50 × 20–27 μ, outer wall striate 6–10 μ thick, inner verruculose 6–7 μ thick. Aecidiospores globose, sub-globose or ellipsoid, contents intensely orange, 29–34 μ diam. or up to 48 μ long and 21–24 μ broad; epispore hyaline, about 2 μ thick, very closely and delicately verruculose.

II. Uredospores in the same sori as the teleutospores, oblong, slightly attenuated below but rounded at the base, densely and minutely aculeate especially near the apex, yellow-brown, epispore rather thick, 52–66 × 20–28 μ.

III. Teleuto-sori amphigenous, rarely on the sepals, not forming leaf-spots, usually scattered, minute, punctiform, 0·5 mm. diam., round or ellipsoid, sometimes confluent, surrounded by torn fragments of the epidermis, pulverulent, dark brown. Teleutospores ellipsoid, always acuminate and as it were, drawn out into a paler, cone-shaped apicule, not constricted at the septum, rounded at the base, dark reddish-brown, 38–54 × 22–30 μ, epispore about 5 μ thick, densely and grossly verrucose; pedicel thick, hyaline, cylindrical except at the base, where there is a vesiculous inflation, with irregular crenate margins.

Host: Lycium afrum Linn., near Capetown, 1886, MacOwan (Rabh. Fung. Eur., 3506, 4018) [3846, 4358 and 6890].

Distribution: South Africa.



Puccinia afra.
Teleutospores.

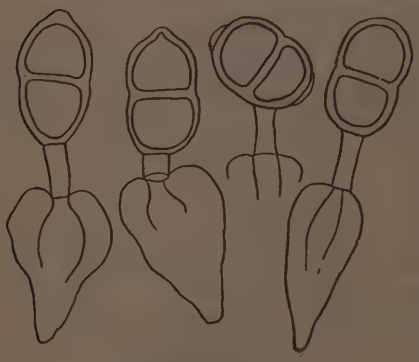
This interesting species is represented in the National Herbarium only by MacOwan's original collection. Sydow (*loc. cit.*) states that it differs from all other species of Puccinia on Lycium spp. in the pointed apex of the teleutospore, but in certain collections of Puccinia Lycii [9783], the apex of the teleutospores is sometimes acute.

38. **Puccinia Lycii**, Kalch.

Grevillea XI, p. 21 ; Syd. Monogr. Ured. I, p. 265.
Syn. *Puccinia pulla*, Kalch. in herb.

II. Uredo-sori mostly hypophyllous, scattered, minute. brown ; uredospores ellipsoid or ovate, rounded at both ends, yellowish-brown, 40–54 × 20–33 μ, epispore rather thick (about 3 μ) densely and minutely aculeate in the upper three-fourths, smooth near base, one germ pore apical, others if present, obscure. Uredospores often intermingled with the teleutospores.

III. Teleuto-sori amphigenous, not forming leaf-spots, scattered or in groups, about 1 mm. diam., round, rather flat, pulverulent, black. Teleutospores broadly ellipsoid, rounded at both ends or acute at the apex, apex sometimes produced into a flat, lighter coloured papilla, not constricted at the septum or very slightly so, opaque, dark brown, 38–50 × 20–30 μ ; epispore about 3 μ thick, not thickened at the apex, very finely verruculose ; germ pores obscure, about one-third of the distance between apex and septum and between base and septum ; pedicel hyaline thick, the whole up to 100 μ long, and consisting of a cylindrical portion 10–24 μ long and 6–6·5 μ thick immediately below the spore, and a lower napiform portion, 60–80 μ long, 20–45 μ broad at the broadest point and gradually tapering towards the base.



Puccinia Lycii.
Teleutospores.

Hosts : Lycium tubulosum Nees, near Somerset East, Mac Owan (Rabh. Fung. Eur. 3122) [3461].

Lycium hirsutum Dunal., Bloemfontein, 2.1.11, Pole Evans [1169] ; 17.5.11, Van der Merwe [1496] ; 28.6.12, Pole Evans [5168].

Lycium austrinum Miers., Amanzi, Uitenhage, 8.9.16, Pole Evans [9783].

Lycium oxycladum Miers., Smitskraal, Boshoff District, 9.11.11, Pole Evans [1913].

Distribution : South Africa.

Withania Pauq.

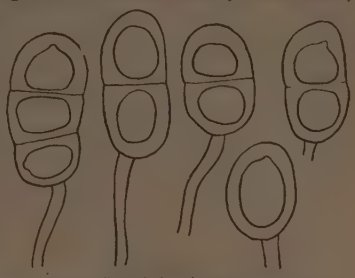
39. **Puccinia Atropae** Mont.

Fl. canar., p. 88 ; Syd. Monogr. Ured. I, p. 262.

Syn. *Aecidium Atropae* Mont. Fl. Canar., p. 89.
Ae. Dietelianum P. Henn. in Engl. Bot. Jahrb., XVII, p. 16.
Ae. Withaniae Thuem. in Flora. LX, 1877, p. 411 ; Syd. Monogr. Ured. IV, p. 110.

I. Aecidia hypophyllous or on the thickened petioles, peduncles and calyces ; when hypophyllous they are in circular clusters on more or less definite brown spots, and they frequently cover the entire surface of leaves, petioles and calyces. Aecidia at first closed, then open, long, cylindrical, up to 1 mm. long, up to 500 μ diam. ; margin of the

peridium white, caducous, erect, lacerate; cells of the peridium rather loosely connected, oblong, 24–42 × 15–22 μ, walls 2–3 μ thick, outer striate, inner verrucose. Aecidiospores angular-globose, 16–28 × 14–20 μ; wall thin, hyaline, verruculose, contents yellow.



Puccinia Atropae.
Teleutospores, including one three-celled spore and one mesospore.

III. Teleuto-sori caulicolous, very numerous, arising under the epidermis and causing a blistered appearance of the stem surface, finally erumpent, confluent, round or oblong, black, pulverulent. Teleutospores ellipsoid to ellipsoid-oblong, sometimes sub-globose, rounded at both ends, not constricted at the septum or slightly so, 30–45 × 17–25 μ, rarely up to 70 μ long, light chestnut-brown; epispore smooth, 2·5–3·5 μ thick, not thickened at the apex; germ pore apical in the upper cell, obscure in lower; pedicel thin, hyaline, deciduous, up to 100 μ long. Three-celled and one-celled teleutospores are not uncommon.

Host: Withania somnifera Dun., Boschberg, Cape Province, 1875, MacOwan 1138; Natal, Medley Wood 447 [10320]; Hebron, Orange Free State, 26.2.08, Gunn [746]; Skinners Court, Pretoria District, November, 1910, Pole Evans [1009]; Garstfontein, Pretoria District, 21.5.11, 16.6.12, 27.10.12, Pienaar [1485, 2450, 5633]; Salisbury, Rhodesia, 1.1.18, Walters [11010]; Pretoria, 2.12.19, and January, 1920, Bottomley [12515, 12838]; Onderstepoort, Pretoria District, 3.3.24, Du Toit [18118 and 18119]; Bethlehem, Orange Free State, 5.3.15, Van der Merwe [8917]; Salisbury, Rhodesia, December, 1919, Eyles [14010]; Langholm Estates, Bathurst District, Cape Province, 29.11.24, Bottomley [19872].

Distribution: South Africa, Abyssinia, Canary Islands, East India.

The aecidia are found from November to January or later until March; the teleuto-stage occurs in February and March, it has been repeatedly found on the same plants with the old aecidia, and there seems to be no reasonable doubt that Aecidium Withaniae is the aecidial stage of P. Atropae.

Withania somnifera occurs very commonly as a weed in cultivated lands; it extends into the drier sub-tropical parts of India, Arabia, Persia, the Mediterranean region and tropical Africa.

Species parasitic on the **Labiatae.**

Becium Lindl.

40. **Puccinia Becii** n. sp.

I. Aecidia hypophyllous, closely crowded on round, yellow-brown leaf-spots, 1–4 mm. diam., these groups being often numerous and covering a large part of the leaf surface, cupulate, 250–300 μ diam.; margin of the peridium slightly recurved and incised; cells of the peridium firmly joined together, oblong, in more or less regular rows, 17–22 μ long, imbricate, outer wall striate 5–6 μ thick, inner striato-verruculose, 3–4 μ thick. Aecidiospores sub-globose or broadly ellipsoid, angular, 16–20 × 23-17 μ; epispore about 1 μ thick, very delicately verruculose, hyaline; contents yellow.

Puccinia Becii.
Teleutospores.

III. Teleuto-sori hypophyllous, dark brown, minute, developing in the old aecidia. Teleutospores light chestnut-brown, darker at the apex, clavate or cuneate, attenuate at the base, not constricted at the

septum or very slight so, at the apex more or less broadly rounded, acute or acuminate more rarely truncate, 40–70 × 17–27 μ; epispore smooth, about 1 μ thick, very strongly thickened at the apex (12–20 μ); germ pores apical and just below the septum; pedicel very short (up to 15 μ), light brown, persistent.

Host: Becium obovatum N.E. Br., I, Natal, Medley Wood [10297, 10298 and 11198]; I, Garstfontein, Pretoria Disrrict, 16.2.13, Pienaar [6609]; I and III, Graskop, Transvaal, 16.1.21, Pole Evans [14689]; I, Cedara, Natal, 8.1.25, Staples [20308].

Distribution: Natal and Transvaal.

Leonotis Pers.

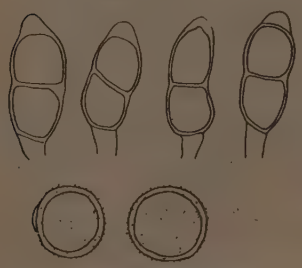
41. **Puccinia leonotidicola,** P. Henn.

Botan. Ergebnisse der Kunene-Sambesi Exped. 1902, p. 3; Syd. Monogr. Ured. I, p. 280.

Syn. *Aecidium Leonotidis* P. Henn. in Engl. Pfl. Ost-Afr., C. 52.
Dicaeoma Leonotidis Arth. North Am. Flora VII, p. 407, 1921.

[O. Spermogones hypophyllous, spermatia oblong, 2·5–3 × 4–5 μ.

I. Aecidia amphigenous, chiefly hypophyllous, in groups on yellowish spots, sometimes solitary, pustulate; peridium finally cupulate; aecidiospores globose, oblong or ovoid, 20–24 × 20–32 μ; wall hyaline or yellowish, verrucose.]



Puccinia leonotidicola.
Teleutospores and uredospores.

II. Uredo-sori amphigenous, on indistinct yellow-brown leaf-spots, scattered or more or less grouped, minute, about 1 mm. diam., cinnamon brown. Uredospores globose or sub-globose, 21–30 μ diam; epispore minutely and densely echinulate, yellow-brown, about 1 μ thick, with three prominent germ pores on one face.

[III. Teleuto-sori amphigenous, on indistinct yellow-brown leaf-spots, scattered, minute, about 0·5 mm. in diam., pulverulent, brown. Teleutospores ellipsoid, apex rounded or sub-acute, rounded at the base, not constricted at the septum or very slightly so, yellow-brown, 25–40 × 16–23 μ; epispore smooth, about 1 μ thick, and with a conical or broadly papilliform thickening (up to 5 μ) at the apex; germ pores not evident; pedicel hyaline, rather thick, equalling the spores in length.]

Hosts: Leonotis dysophila E. Mey., Lourenco Marques, 14.2.10, Howard [707]; Garstfontein, Pretoria District, 11.4.11, Doidge [1375]; New Agatha, Zoutpansberg District, 7.8.11, Doidge [1819].

Leonotis sp., Winkle Spruit, Natal, 6.7.12, Doidge [2508].

Distribution: South Africa and tropical Africa.

All the South African collections are in the uredo stage only. The teleutospores were described from material collected by Dummer in Uganda [11740 and 12012].

Leonotis is an African genus of thirty-two species; only one species extending to tropical Asia and America.

Leucas Burm.

42. **Puccinia Leucadis** Syd.

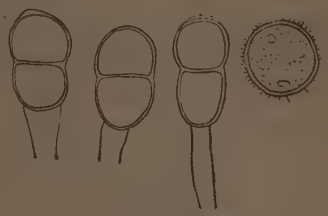
Monogr. Ured. I, p. 281.

Syn. *Uredo Leucadis* Syd. in Hedwigia 1899, p. 132.

II. Uredo-sori amphigenous, but mostly hypophyllous, numerous, only occasionally producing discoloured spots on the leaves, scattered or in groups, but usually very

numerous and becoming confluent, pulverulent, reddish-brown, individual sori 0·5–1 mm. diam. Uredospores usually a perfect sphere, brown, 20–28 μ diam.; epispore finely aculeate, golden-brown, with 3–5 prominent germ pores on one face.

III. Teleutospores scarce, intermingled with the uredospores, ellipsoid, rounded at both ends, not thickened at the apex or slightly so, slightly constricted or not constricted at the septum, subhyaline, smooth 30–38 × 16–22 μ; pedicel hyaline, up to 50 μ long, usually 6–6·5 μ thick, but sometimes swollen just below the spore up to 10 μ. Contents granular. Germ pores obscure, one probably apical.



Puccinia Leucadis.
Teleutospores and one uredospore.

Hosts: Leucas martinicensis L., on leaves, Malvern, Natal, 18.3.10, Doidge [883]; Garstfontein, Pretoria District, 16.2.11, 5.5.13, 14.5.13, 13.3.15, Pienaar [1211, 6598. 6660, 8915]; Kentani, Cape Province, 2.6.14, Pegler [7810]; Groenkloof, Pretoria, 9.4,15, Pole Evans [9093]; Ashburton, Natal, 22.4.16, Doidge [9701]; Acton Homes, Natal, 23.5.20, Bottomley [14161]; near Maritzburg, Natal, 24.2.25, Doidge.

Leucas glabrata R.Br., Table Mt., Natal, 18.5.11, Fuller [1640].

Distribution: South Africa.

Originally described by Sydow from material collected near Durban, Natal, by Medley Wood. I have not seen the type.

Uredospores are formed in great profusion, and only a few scattered teleutospores were found, which were almost hyaline, and possibly not properly mature (Syd. *loc. cit.*).

Mentha L.

43. **Puccinia Menthae** Pers.

Pers. Syn. Fungi., p. 227 (1801); Syd. Monogr. Ured. I, p. 282.

Syn. *Dicaeoma Menthae* Gray. Nat. Arr. Brit. Pl. 1, 542, 1821.

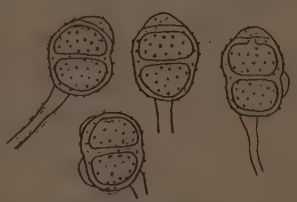
For extensive synonymy see Sydow., *loc. cit.*

[O. Spermogonia amphigenous, in small groups or scattered, honey-coloured.

I. Aecidia chiefly hypophyllous and caulicolous, on the leaves situated on purple-brown areas, and arranged in more or less regular groups, on the stems, petioles and leaf-veins, forming dense groups, often very much elongated, more rarely scattered. Peridia cupulate, about 250 μ diam., opening irregularly, margin lacerate, erect or somewhat incurved. Aecidiospores sub-globose, ellipsoid or angular, 24–40 × 17–28 μ; epispore pale yellow, 1·5–2 mm. thick, densely and coarsely verruculose, cell contents orange-yellow.

II. Uredo-sori hypophyllous on yellow or brownish leaf-spots, scattered or in groups, minute, circular or elliptical, pulverulent, surrounded by the ruptured epidermis. Uredospores globose, sub-globose, ellipsoid or obovate, 17–28 × 14–20 μ; epispore sparsely and coarsely echinulate, pale brown, 1·5 μ thick, with 3 equatorial germ pores.]

III. Teleuto-sori hypophyllous, rarely caulicolous, scattered or in groups, minute, up to 0·5 mm. in diam., chocolate-brown, pulverulent, surrounded by the ruptured epidermis. Teleutospores broadly ellipsoid to sub-globose, broadly rounded at both ends, slightly or not constricted at the septum, 22–35 × 18–23 μ, chestnut-brown; epispore minutely and somewhat sparsely verrucose, 1–2 mm. thick, not thickened at



Puccinia Menthae.
Teleutospores.

the apex; germ pore of the upper cell apical, conspicuous, with a pale or hyaline papilla, germ pore of basal cell varying in position between septum and pedicel, but most frequently just below the septum, conspicuous, papillate; pedicel persistent, hyaline, fragile, up to 40 μ long.

Hosts: Mentha aquatica L., Pretoria, 27.6.13, Pole Evans [6850].

Mentha longifolia Huds, sub. sp. capensis, Natal, Medley Wood (466) [10488]; Dordrecht, 13.1.12, Pienaar [2017]; Tweespruit, Ladybrand District, 25.4.15, van der Merwe [8962].

Mentha viridis L., Pretoria, 17.6.12 and 15.5.13, Pole Evans [2495 and 6680].

Distribution: South Africa, Europe, Asia, North America, North Africa, Australia, New Zealand.

Only the teleuto-stage has been collected in South Africa.

Ocimum L.

44. **Puccinia Ocimi** n. sp.

Syn. *Aecidium Ocimi* P. Henn. in Engl. Bot. Jahrb. XVII, 1893, p. 16.

O. Unknown.

I. Aecidia hypophyllous, on round yellow-brown leaf-spots, 2–4 mm. diam., in closely crowded groups, which may be more or less circular, or elongated if occurring on a vein cupulate or briefly cylindrical, 200–300 μ diam.; margin of the peridium white, laciniate, recurved; cells of the peridium firmly joined together, oblong, 22–30 × 15–20 μ, outer wall striate, 6–8 μ thick, inner wall verruculose, 3–4 μ thick. Aecidiospores sub-globose, ellipsoid or angular, sub-hyaline, 17–20 × 17–27 μ; epispore hyaline, 1–2 μ thick, closely and delicately verruculose; contents yellow, soon becoming decolourised.

Puccinia Ocimi.
Teleutospores.

III. Teleuto-sori caulicolous and hypophyllous, on brown leaf-spots, often interspersed with the aecidia, in closely crowded groups, minute, black, pulvinate, surrounded by the torn epidermis. Teleutospores golden-brown, clavate to ellipsoid, slightly constricted at the septum, attenuate at the base, rounded or bluntly acute at the apex, 40–60 × 16–24 μ; epispore smooth, 3–3·5 μ thick, at the apex thickened up to 8·5 μ; germ pores apical and just below the septum; pedicel hyaline or yellowish, persistent, up to 80 μ long.

Hosts: Ocimum suave Willd., on leaves, Durban, 5.3.09, Medley Wood [786 and 11201]; Winkle Spruit, Natal, 2.7.11 and 29.1.12, Pole Evans [1595 and 2021]; Wonderboom, Pretoria District, 1.5.16, Pole Evans [9730]; Durban, 28.10.19, Van der Bijl [12335].

Ocimum americanum L., on leaves and stems, Zilikats Nek, Pretoria District, 14.2.19, Doidge [12244, 12245].

Distribution: Natal and Transvaal.

The genus Ocimum, of which there are many species throughout the warmer parts of the world, is represented in South Africa by five species.

Orthosiphon Benth.

45. **Puccinia galerita** n. sp.

III. Teleuto-sori amphigenous on small yellow leaf-spots, very minute, up to twenty in a circular group 1 mm. in diameter, black, convex, pulvinate, surrounded by the torn epidermis. Teleutospores clavate or clavate-ellipsoid, often bent or asymmetrical, golden-yellow, but becoming much darker (chestnut-brown) at the apex, rounded, sub-acute or truncate at the apex, attenuate or rarely sub-rounded at the base, not constricted at the septum or very slightly so, 30–44 × 20–24 μ; epispore thin, smooth, less than 2 μ, except at the apex, where it is thickened up to 15 μ, apex very distinctly lamellate; germ pores apical and just below the septum; pedicel hyaline, persistent, up to 30 μ long.

Puccinia galerita.
Teleutospores.

X. Mesospores not numerous, clavate or ellipsoid, about 30 × 20 μ.

Host: Orthosiphon Pretoriae Gurke, on leaves, 18.4.17, Kaalfontein, Pretoria District, Pole Evans [10988].

Distribution: Transvaal.

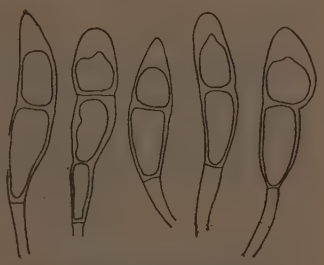
Distinguished from P. pallens by the broader spores with deep brown apices.

46. **Puccinia pallens,** Syd.

Ann. Myc., 1903, p. 19; Monogr. Ured. I, p. 876.

Syn. *Puccinia pallida* Mass. Kew. Bull., 1901, p. 168 (nec. Tracy).

III. Teleuto-sori hypophyllous, on round yellow-brown leaf-spots, closely crowded in groups of 6–10 in the centre of the spot, dark rusty-brown, pulverulent. Teleutospores pale straw-coloured, clavate or narrow ellipsoid, apex rounded or sub-acute, attenuate into the pedicel at the base, slightly constricted at the septum, the cells separate very readily, upper cell usually shorter and slightly broader than the lower, 36–57 × 11–17 μ; epispore smooth, 1–1·5 u thick, strongly thickened at the apex (8–13·5 μ); germ pore apical, obscure in the lower cell; pedicel persistent, pale straw-coloured, concolorous with the lower part of the spore, or sub-hyaline, up to 45 μ long and 6·5 μ thick.



Puccinia pallens.
Teleutospores, one 3-celled spore.

Host: Orthosiphon sp., on leaves, Van Reenen, Drakensberg, March, 1895, Medley Wood.

Distribution: South Africa.

This fungus is not represented in the National Herbarium, and was described from the type specimen at Kew, which I was able to examine through the courtesy of the Director.

Plectranthus L'Her.

47. **Puccinia luandensis** Syd.

in Monogr. Ured. I, p. 287, Tab. XIX, Fig. 271.

Syn. *Uredo Plectranthi* Kalch. in herb.

II. Uredo-sori hypophyllous, not producing leaf-spots, scattered, very minute, round, pulverulent, rust-coloured. Uredospores globose or sub-globose, delicately verruculose, light brown, 20–30 μ diam.

III. Teleuto-sori hypophyllous, not on leaf-spots, scattered, very minute, round, almost always covered by the raised, ashy or lead-coloured epidermis. Teleutospores ellipsoid, rounded at both ends, not thickened at the apex or slightly so (up to 4 μ), usually slightly constricted at the septum, smooth, brown, 40–52 × 24–30 μ; pedicel hyaline, persistent, often curved, thick, up to 55 μ long.

Host: Plectranthus sp. on living leaves, Inanda, near Port Natal, Medley Wood.

Distribution: Natal.

I have not seen this species, and can only quote the original description.

48. **Puccinia Plectranthi** Thuem.

in Flora 1875, p. 378; Grevillea X, p. 126; Syd. Monogr. Ured. I, p. 286.

I. Aecidia not seen; they are described by Cooke (Grevillea, *loc. cit.*) as occurring on discoloured leaf-spots; peridium with a white fimbriate margin; aecidiospores yellow.

Puccinia Plectranthi. Teleutospores.

III. Teleuto-sori hypophyllous on minute, circular, brown leaf-spots, scattered or in circular groups, pulvinate, rusty-brown. Teleutospores clavate or sub-clavate, rounded or less frequently truncate at the apex, constricted at the septum, attenuated at the base into the rather thick pedicel, smooth, pale fuscous or almost hyaline, 30–54 × 15–19 μ; epispore smooth, thin (1 μ or less), thickened at the apex, up to 10 μ; germ pores apical and just below the septum; pedicel up to 8·5 μ thick, hyaline, persistent and up to 22 μ long.

Host: Plectranthus sp. on leaves, Puff Adder Hill, 14.5.84, Natal, Medley Wood 3496 [326].

Plectranthus laxiflorus Bth., Boschberg, Cape Province, 1875, MacOwan 1136; Howick, Natal, 24.3.13, Franks [6688]; Kentani, Cape Province, 8.5.14 and 24.6.14, Pegler [7762 and 7821].

Distribution: Natal and the Transkei.

An aecidium has been collected on Plectranthus in the Transvaal and in Rhodesia, but there is nothing to connect this with Puccinia Plectranthi; there are also some specimens of Medley Wood's labelled Ae. Plectranthi, but these are in too poor a condition for study.

Salvia L.

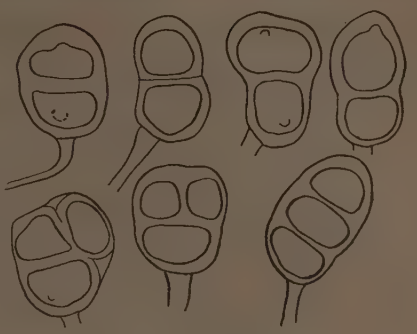
49. **Puccinia Salviae-runcinatae** n. sp.

O. Spermogones epiphyllous, not numerous, in small groups among the aecidia, honey-yellow, becoming almost black with age, 100–160 μ diam.

I. Aecidia amphigenous and caulicolous, closely crowded in small round or oblong groups up to 5 mm. diam., or following the veins or forming extended lines on the stems, often causing a slight distortion of the young shoots, yellow, long remaining closed, finally open, cupulate, 300–400 μ diam.; margin of the peridium erect or slightly incurved, incised, white. Cells of the peridium rhomboid to oblong, 24–40 × 20–25 μ, outer wall striate, 6–7 μ thick, inner verrucose, 3–4 μ thick. Aecidiospores sub-globose, oblong or ellipsoid, 20–30 × 16–20 μ; epispore about 1·5 μ thick, delicately verruculose.

II. Uredo-sori hypophyllous, minute, scattered, pulverulent, cinnamon-brown, surrounded by the torn epidermis. Uredo-spores globose to ellipsoid, 20–24 × 16–20 μ; epispore golden-brown, about 1·5 μ thick, moderately echinulate and with 3 equatorial germ pores.

III. Teleuto-sori caulicolous, elliptical, small, black, bullate, long remaining covered, at length becoming erumpent. Teleutospores chestnut-brown, broadly ellipsoid, frequently irregular and distorted, broadly rounded at both ends, not constricted or slightly so, 40–45 × 23–35 μ; epispore smooth, 3–3·5 μ thick, slightly thickened (up to 9 μ) at the apex; germ pores conspicuous, papillate, in the upper cell apical or one-third of the distance from apex to septum, in the lower usually about one-third of the distance from base to septum, but occasionally basal when the pedicel is inserted obliquely; pedicel hyaline, persistent, fragile, up to 100 μ long, often inserted obliquely or even transversely; 3-celled spores occur.



Puccinia Salviae-runcinatae.
Teleutospores, three abnormal spores.

Host: Salvia runcinata Linn. f., on leaves and stems, I, Skinner's Court, Pretoria, October, 1910, Pole Evans [1008]; II, Holfontein, Lichtenburg District, 1.1.11, Pienaar [1053]; III, Skinner's Court, Pretoria, 31.12.11, Pole Evans [1062].

Distribution: Transvaal.

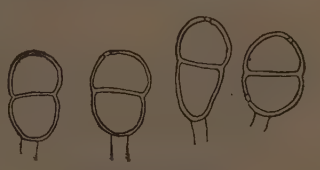
Stachys L.

50. **Puccinia aethiopica** Kalch. and Cke.

in Grevillea XI, p. 22; Syd. Monogr. Ured. I, p. 298.

II. Uredo-sori hypophyllous, rarely epiphyllous, scattered or in groups, minute, pulverulent, cinnamon-brown. Uredospores globose or sub-globose, yellow, moderately echinulate, 22–27 μ diam., with 5 germ pores on 1 face.

III. Teleuto-sori amphigenous and caulicolous, mostly hypophyllous, small, about 0·5 μ diam., chocolate brown, pulverulent, surrounded by the torn epidermis, scattered or in groups, but often so numerous on the under side of the leaf as to become confluent and form a continuous layer, leaving only the midrib of the leaf exposed. Teleutospores golden-brown, broadly ovate to sub-globose, slightly constricted at the septum, broadly rounded at both ends, 23–40 × 18–24 μ; epispore thin (about 1 μ) smooth, not thickened at the apex; germ pore in upper cell occasionally apical, but usually about one-third of the distance from apex to septum, in lower cell lateral, not immediately below the septum; pedicel short, hyaline, deciduous, often inserted obliquely.



Puccinia aethiopica.
Teleutospores.

X. Mesospores rare.

Hosts: Stachys dregeana Bth., on leaves and stems, Standerton, Transvaal, 20.1.14, v. d. Merwe [7351].

Stachys hyssopoides Burch., Bloemfontein, Orange Free State, 18.4.12, Pienaar [2236]; December, 1916, Potts [9755].

Stachys sp., Somerset East, Trollip, ex herb, Pazschke [6889].

Distribution: South Africa.

Species parasitic on the **Verbenaceae.**

Lantana L.

51. **Puccinia natalensis** (Diet. et Syd.

in Hedwigia, 1899, p. (130); Monogr. Ured. I, p. 306.

III. Teleuto-sori hypophyllous, on small leaf-spots which are at first yellow and then brown, scattered, 1–1·5 mm. diam., round, naked, pulvinate, dark brown. Teleutospores ellipsoid or ovate-oblong, rounded at the apex, rounded or somewhat attenuate at the base, not constricted at the septum or slightly so, deep honey-coloured, 42–56 × 26–36 μ; epispore smooth, up to 5 μ thick, slightly thickened at the apex (up to 8·5 μ); germ pore in the upper cell apical, obscure in the lower; pedicel hyaline, stout, equalling the spore in length, or exceeding it, and up to 140 μ.

Puccinia natalensis: Teleutospores.

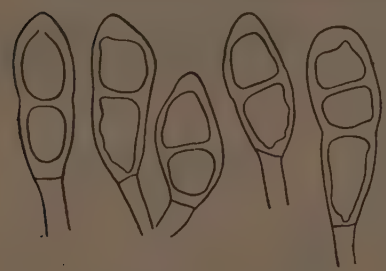
X. Mesospores not observed.

Host: Lantana salviaefolia, Jacq., on living leaves, Umzinyati, Natal, Medley Wood 71 [11160 and 10490]; Inanda, Natal, Medley Wood 85 [10515]; Zululand, March–April, 1888, Medley Wood [357 and 836]; Malvern, Natal, 18.3.10, Doidge [884].

Distribution: Natal and Zululand.

—— —— var. **Evansii** n. var.

III. Teleuto-sori hypophyllous, on brown or purplish-brown leaf-spots, scattered or in groups and becoming confluent, rusty brown, round or somewhat elongated along the veins, pulvinate. Teleutospores pale honey-coloured, ellipsoid, apex bluntly acute or somewhat rounded, base attenuate or rounded, not constricted at the septum or very slightly so, 40–60 × 20–27 μ; epispore 3–3·5 μ thick, smooth, often uneven in thickness; germ pores apical and basal; pedicel stout, persistent, hyaline, up to 120 μ long.



Puccinia natalensis var. *Evansii.* Teleutospores, one three-celled spore.

X. Mesospores fairly numerous, 36–44 × 20–24 μ, similar in shape to 2-celled spores; 3-celled spores occur.

Host: Lantana salviaefolia Jacq., on living leaves, Barberton, 29.8.11, Pole Evans [1850]; Duivelskloof, Northern Transvaal, 9.8.11, Doidge [1816].

Distribution: Transvaal.

The Transvaal collections differ from the specimens collected in Natal in the more slender, paler teleutospores, with a bluntly tapering apex. Mesospores and 3-celled spores occur, which have not been observed in the type. I therefore consider that this is a distinct variety of P. natalensis.

Lippia L.

52. **Puccinia lippiivora** Syd.

in De Wildem. Flore du Bas-et Moy. Congo t. III; fasc. I (1909), Extr. p. 11; Sacc. Syll. Fung. XXI, p. 663.

III. Teleuto-sori hypophyllous, not producing leaf-spots or causing only slight discoloration, scattered or in small groups, small, hemispherical, pulvinate, 0·3–0·5 mm. diam., dull brown. Teleutospores oblong or ovate oblong, rounded at both ends, slightly constricted at the septum, pale yellow-brown, 40–60 × 16–25 μ; epispore smooth, about 3 μ thick, very slightly thickened at the apex, or up to 9μ thick; germ pore in upper cell apical, obscure in the lower; pedicel persistent, rather thick, hyaline, often flexuous, longer than the spore and up to 120 μ long.

Puccinia lippiivora.
Teleutospores and one mesospore.

X. Mesospores not numerous, about 30–34 × 16–20 μ.

Host: Lippia asperifolia Rich., on living leaves, Inanda, Natal, Medley Wood 538 [10504 and 11161]; Barberton, 4.2.11, Pole Evans [1157]; Letaba Drift, Zoutpansberg, 6.8.11, Doidge [1817]; Barberton, Pole Evans, 29.8.11 [1859]; Cramond, Natal, 3.6.12, Pole Evans [2407]; Barberton, 27.4.15, Lansdell [11665]; Entumeni, Zululand, June, 1916, Haygarth [14191].

Distribution: South and tropical Africa.

P. Lippiivora was described by Sydow (*loc. cit.*) from material collected in the Congo. I have not seen the type specimen, but the South African rust agrees very well with the original description; some of the spores, however, are more strongly thickened at the apex.

Species parasitic on **Convolvulaceae.**

Ipomoea L.

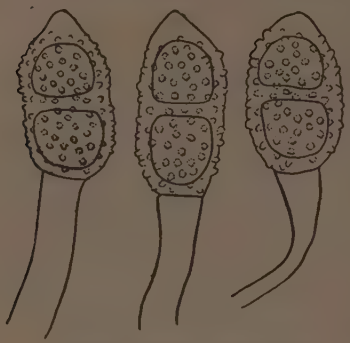
53. **Puccinia Ipomoeae-panduratae** (Schw.) Syd.

in Monogr. Ured. I, p. 323.

Syn. *Aecidium Ipomoeae-panduratae* Schw. Syn. Fg. Carol. p. 69 (1822).
Ae. Ipomoeae Speg. Fung. Argent. I, p. 173 (1880).
Caeoma convolvulatum Lk. Spec. II, p. 49 (1824).
Puccinia crassipes B. and C. North American Fg. n. 553 in Grevillea III, p. 54; Sacc. Syll. Fung. VII, p. 716.
P. Ipomoeae Cke. in Rav. Amer. Fg., p. 792; Lagh. Ured. Herb. El. Fries., p. 61; Sacc. Syll. Fung. VII, p. 671.
P. opulenta Speg. Fung. Argent. I, p. 170, et Fung. Guaranit. I, p. 53; P. Hennings in Hedwigia, 1995, p.192; Sacc. Syll. Fung. VII, p. 619.

I. Aecidia hypophyllous or petiolar, on leaf-spots which are yellow or yellow-brown and round to irregular in outline, rarely epiphyllous, usually in round or irregular groups, 1–2 mm. diam., rarely solitary, at first covered, strongly convex, later becoming erumpent, cupulate, up to 500 μ in diam.; margin of the peridium white, laciniate, incurved; cells of the peridium firmly joined together, oblong to sub-rhomboid,

30–40 × 16–24 μ, outer wall smooth, 5–6 μ thick, inner striately verrucose. Aecidiospores globose, sub-globose or ellipsoid, often somewhat angular by compression, 20-24 μ diameter or up to 30 μ long and 14–20 μ broad; epispore 2–2·5 μ thick, hyaline, minutely and closely verruculose; contents golden-yellow.



Puccinia Ipomoeae-pandura'ae.
Teleutospores.

III. Teleuto-sori amphigenous, often opposite the aecidia, sub-orbicular or irregular, rather large, often confluent and then up to 4 mm. in diam., black, pulverulent, surrounded by the torn epidermis. Teleutospores oblong, produced at the apex into an obtuse pellucid papilla, rounded at the base, slightly constricted at the septum, chestnut brown, 42–62 × 30–37 μ; epispore 3·5–4 μ thick, grossly verrucose, apex thickened, up to 14 μ; germ pores obscure; pedicel stout, persistent, tinted brown at the apex just below the spore, up to 170 μ long and 15 μ thick, usually not more than 10 μ thick.

X. Mesospores not numerous, ellipsoid, about 45 × 30 μ.

Hosts: Ipomoea albivenia Sweet., on leaves and petioles, Pretoria, 10.5.14, Pole Evans [7818]; Bandolier Kop, Transvaal, 18.1.25, Doidge [20317]; Pietersburg, Transvaal, 13.1.14, Pienaar [7369]; Muden, Natal, 17.5.17, Fuller [10129].

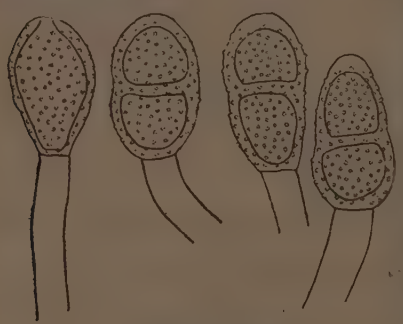
Distribution: South Africa, North and South America.

This species differs from P. Batatae in the more grossly warted epispore and the obtuse pellucid papilla at the apex of the teleutospore. In the specimens examined, I have not found that the spores are noticeably smaller than those of P. Batatae, as stated by Sydow (*loc. cit.*). The width of the teleutospores is rather greater than that given for P. Ipomoeae-panduratae, but all other characters are identical.

54. **Puccinia Batatae** Syd.

in Monogr. Ured. I, p. 323.

I. Aecidia hypophyllous, on brown or almost black leaf-spots, solitary or in small, irregular groups, rather deeply immersed, cupulate, 400–500 μ diam.; margin of the peridium white, almost entire; cells of the peridium not very firmly connected, oblong to polygonal, variable in size, 30–45 × 16–33 μ, outer wall smooth, 5–6 μ thick, inner wall rather coarsely verruculose-aculeate, 3–4 μ thick. Aecidiospores globose, sub-globose, angular or rarely broadly ovate, 24–33 μ diam.; epispore uniformly about 1 μ thick, closely and minutely verruculose.



Puccinia Batatae.
Teleutospores.

III. Teleuto-sori epiphyllous, opposite the aecidia, or more rarely hypophyllous among the old aecidia, rather flat, round or irregular, surrounded by the torn epidermis, pulverulent, dark brown. Teleutospores golden-brown, ellipsoid-oblong, more rarely clavate, rounded at the apex, rounded or more rarely sub-attenuate at the base, slightly constricted at the septum, 50–60 × 27–35 μ; epispore about 3 μ thick, usually slightly thickened (up to 6·5 μ) at the apex; germ pores obscure; pedicel stout, persistent, straight or flexuous, often tinted brown at the apex, up to 140 μ long and 15 μ thick, occasionally inserted obliquely.

X. Mesospores rare, ellipsoid, 40–45 × 27 μ.

Host: Ipomoea digitata L. (= Batatas paniculata), near Durban, Natal, Medley Wood [354]; Winkle Spruit, Natal, 6.7.12, Doidge [2506]; Durban, Natal, 1.4.14, Bottomley [7822].

Distribution: Natal coast.

Sydow gives the dimensions of the spores as 50–75 × 30–40 μ, but I failed to find any as long as 75 μ or as wide as 40 μ.

55. **Puccinia holosericea,** Cke.

Grevillea X. p. 126; Monogr. Ured. I, p. 326.

III. Teleuto-sori hypophyllous on yellow or brown depressed leaf-spots, which are up to 1 cm. in diam., hidden amongst the leaf-hairs, minute, but densely crowded in groups 0·25–1 cm. diam., and becoming confluent, covered, compact, purple-brown. Teleutospores yellow, very variable in form, oblong, clavate or ellipsoid, rounded, somewhat acute or truncate at the apex, more or less constricted at the septum, attenuate at the base, 34–63 × 14–20 μ; epispore thin, smooth, more or less thickened at the apex (4–10 μ); germ pores apical and just below the septum; pedicel sub-hyaline, persistent, up to 50 μ long and 6–10 μ thick.

Puccinia holosericea.
Teleutospores.

X. Mesospores not numerous, variable in form, clavate, oblong or ellipsoid, 38–42 × 14–15 μ.

Hosts: Ipomoea ficifolia Lindl. (= I. holosericea), on leaves, Inanda, Natal, May, 1881, Medley Wood 225 and 560 [10481, 827, 10482, 11159]; Isipingo, Natal, 10.5.13, Doidge [6632]; Durban, 11.4.14, Bottomley [8244]; St. Johns River, Natal, April, 1918, Pole Evans [11658]; Stella Bush, Durban, 26.3.19, Bottomley [12233].

Ipomoea Wightii Choisy., Winkle Spruit, Natal, 5.6.12, Pole Evans [2390]; Wyebank, Natal, 29.5.15, Doidge [9086].

Ipomoea spp., Lemana, Zoutpansberg District, 14.8.11, Doidge [1799]; Tzaneen, 11.1.25, Doidge [20320].

Distribution: Natal and Transvaal.

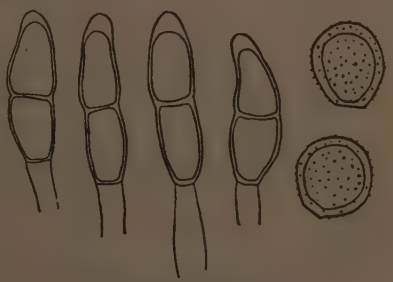
Species parasitic on the **Asclepiadaceae.**

56. **Puccinia Pachycarpi** Kalch. et Cke.

Grevillea XI, p. 23; Syd. Monogr. Ured. I, p. 332.

II. Uredo-sori amphigenous, not on leaf-spots, scattered, solitary or confluent, minute, round, pulverulent, red-brown. Uredospores globose, sub-globose or broadly ovate, 20–27 μ diam.; epispore red-brown, 3–3·5 μ thick, aculeate.

III. Teleutospores in the same sori as the uredospores, very pale, oblong-clavate or elongate, sometimes curved, more or less rounded at the apex, constricted at the septum, attenuate



Puccinia Pachycarpi.
Teleutospores and uredospores.

into the pedicel at the base, upper cell often shorter and broader than the lower, 50–70 × 13·5–20 μ, the two cells easily fall apart at the septum; epispore smooth, delicate, 1–2 μ thick, thickened at the apex up to 6·5 μ; germ pore apical, obscure in the lower cell; pedicel hyaline, persistent, stout, up to 80 μ long and 8–13 μ broad.

Host: Pachycarpus grandiflorus E. Mey. Inanda, Natal, Medley Wood 36 [10493]; Vanstadensberg, Cape Province, December, 1872, MacOwan 1327.

Distribution: South Africa.

57 **Puccinia Schlechteri** P. Henn.

in Hedwigia, 1895, p. 326; Syd. on Monogr. Ured. I, p. 329.

III. Teleuto-sori amphigenous, frequently hypophyllous, covering the whole under surface of the leaves, crowded, not causing leaf-spots, long covered by the epidermis, minute, pulvinate, at first grey-violet, then red-brown. Teleutospores clavate, elongated, rounded or more rarely rather acute at the apex, not thickened or slightly so, slightly constricted at the septum, smooth, pale yellow-brown, 32–48 × 13–18 μ; pedicel hyaline, up to 60 μ long, thick, inflated, sometimes broader than the spore.

Host: Pachycarpus Schinzianus N. E. Br., in living leaves, near Heidelberg, Transvaal, Schlechter.

Distribution: Transvaal.

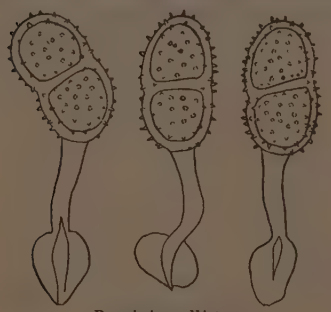
I have not seen this species; the type is not available, and although the host is a plant occurring very commonly in parts of the Transvaal, it is not represented in the National Herbarium. Henning describes uredospores, but Sydow (*loc. cit.*) states that he was unable to find these on the material which he examined.

Species parasitic on the **Apocynaceae.**

58. **Puccinia callistea,** Syd.

in Ann. Myc. VII (1909), p. 543.

II. Uredo-sori amphigenous, mostly hypophyllous, on indefinite, round, yellow leaf-spots, 2–4 mm. diam., only one in each spot, round, minute, punctiform, surrounded by the torn epidermis, pulverulent, light brown. Uredospores globose, sub-globose or ovate, yellow-brown, 28–34 × 22–30 μ; epispore about 1·5 μ thick, strongly aculeate, and with two equatorial germ pores.



Puccinia callistea.
Teleutospores.

III. Teleuto-sori amphigenous, similar in form and position to the uredo-sori, black. Teleutospores ellipsoid, or ellipsoid-oblong, rounded at both ends, chestnut-brown, slightly constricted at the septum, 35–50 × 21–28 μ; epispore 2–3 μ thick, not thickened at the apex, covered with stout prickles, which are much paler than the spore and up to 3 μ long; germ pores lateral, one-third to one-half of the distance from apex to septum and base to septum; pedicel thick, persistent, up to 55 μ long, hyaline, brown at the apex just below the spore, upper part cylindrical, 6–8 μ thick, lower napiform or spathulate, and up to 25 μ broad.

Host: Voacanga Thoaursii Roewet, on living leaves, Polana, Lourenco Marques, Portuguese East Africa, 14.3.09, Howard [632]; Umbelusi, Portuguese East Africa, 3.8.08, Howard [529].

Conopharyngia elegans Stapf, Xalasi, Portuguese East Africa, 28.9.09, Howard [720]; Rikatli Portuguese East Africa, September, 1918, Junod [11722].

Distribution: Portuguese East Africa.

59. **Puccinia Tabernaemontanae** Berk. et Br.

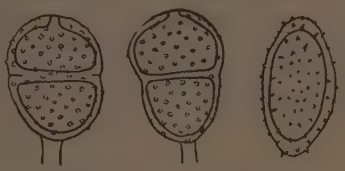
Fungi of Ceylon no. 817 in Jour. Linn. Soc., 1873 ; Sydow Monogr. Ured. I, p. 337 ; Ann. Myc. XX (1922), p. 59 ; Monogr. Ured. IV, p. 320.

Syn. *Aecidium ceraceum* Berk. et Br. in Jour. Linn. Soc. XIV, 1875, p. 94.
Puccinia Cookei De Toni. in Sacc. Syll. Fung. VII, p. 615.
P. Tabernaemontanae Cke. in Grevillea X, p. 125.

O. Spermogones amphigenous, mostly epiphyllous, comparatively numerous and crowded, honey-yellow, 140–180 μ diam.

I. Aecidia amphigenous, on yellow leaf-spots, which are 5–10 mm. diam., somewhat blistered and waxy looking, usually developing in a circle round the spermogonia, not infrequently developing on swollen portions of the petioles and stems. Aecidia cylindrical, up to 2·5 mm. long, 300–400 μ diam., margin of the peridium lacerate ; cells of the peridium firmly joined together, 50–60 × 20–30 μ, walls thin, verruculose. Aecidiospores very variable, ovate, ellipsoid, oblong or angular, thick-walled, coarsely and rather sparsely verrucose-echinulate, almost hyaline, 50–70 × 28–40 μ ; epispore 4–8 μ thick at the sides and 15–25 μ thick at the apex.

II. Uredo-sori hypophyllous, on indeterminate light spots, scattered, small, punctiform, long covered by the blistered epidermis, brown. Uredospores ellipsoid or ovate, coarsely but rather sparsely echinulate, light yellow, 42–50 × 32–37 μ ; epispore 1–1·5 μ thick, somewhat thicker (up to 3 μ) at the apex, with two conspicuous, papillate, equatorial germ pores, papillae broad, hyaline.



Puccinia Tabernaemontanae.
Teleutospores and uredospore.

III. Teleuto-sori similar to the uredo-sori but darker brown. Teleutospores ellipsoid or oblong, broadly rounded at both ends, or somewhat clavate and then less broadly rounded at the base, not constricted at the septum or slightly so, chestnut-brown, 36–46 × 28–31 μ ; epispore finely punctate, almost smooth, 2–3 μ thick, not thickened at the apex ; germ pore in the upper cell apical, with a very flat, hyaline or sub-hyaline papilla, in the lower cell near the pedicel at the base ; pedicel short, delicate, hyaline, persistent, up to 35 μ long.

Host : Conopharyngia ventricosa, Stapf. (=Tabernaemontana ventricosa) II, Inanda, Natal, Medley Wood 612 [10510] ; I, Eshowe, Zululand, 30.1.12, Pole Evans [2024] ; I, Inanda, Natal, January, 1881, Medley Wood 469 [10312, 10313, 13085].

Distribution : Natal and Zululand, Ceylon.

The material in the National Herbarium is very scanty and incomplete. I am indebted to the Director of Kew Herbarium for a slide from Wood's specimen of Puccinia Cookei and for material of P. Tabernaemontanae collected in Ceylon (Thwaites 439).

Species parasitic on **Loganiaceae.**

60. **Puccinia Lindaviana** P. Henn.

in Hedw. 1895, p. 12 ; Syd. Monogr. Ured. I, p. 342.

III. Teleuto-sori hypophyllous, on round, brown or greyish-brown leaf-spots, 3–4 mm. in diameter, scattered, large, 2–5 mm. diam., covering the whole of the leaf-spot, raised, firm, hard, dark brown. Teleutospores ellipsoid to oblong, rounded at the apex, often slightly constricted, rounded or attenuate at the base, brown, 28–44 × 16–25 μ ; epispore smooth, rather thick (3·5–5 μ), not thickened or very slightly thickened at the apex ; germ pores apical and just below the septum ; pedicel hyaline, persistent, up to 100 μ long.

Puccinia Lindaviana.
Teleutospores.

Host: Strychnos Henningsii Gilg., Paddock, Natal, 23.12.13 [8370]; Kentani, Cape Province, 7.10.14, Pegler (Pegler 1951) [8394].

Distribution: South Africa, originally collected on the same host in Pondoland.

Species parasitic on **Oleaceae.**

61. **Puccinia exhauriens** Thuem.

in Flora 1876, p. 425; Syd. Monogr. Ured. I, p. 344.

III. Teleuto-sori hypophyllous or on the branches; on the leaves they are situated on indeterminate pale straw-coloured spots, minute, scattered or in circular groups, often becoming confluent; on the branches, often covering the whole surface for some distance, round, surrounded by the torn epidermis, rather compact or sub-pulverulent, cinnamon-brown. Teleutospores very variable in form, usually clavate or oblong-clavate, rounded or rather acute at the apex, constricted or not constricted at the septum, usually attenuate at the base, grey-brown, more or less translucent, 40–66 μ long, the upper cell usually broader, 18–24 μ, and the lower 14–19 μ; epispore smooth, sometimes strongly thickened at the apex (up to 14 μ) sometimes very slightly so, pedicel hyaline, up to 55 μ long.

Puccinia exhaviens.
Teleutospores.

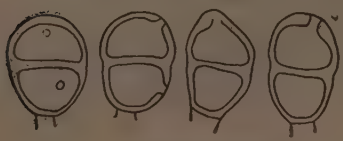
Host: Jasminum tortuosum Willd., Boschberg, nr. Somerset East, 1875, MacOwan 1139, 1874, MacOwan, 1289 [10473]; Capetown, 6.1.22, Putterill [15035].

Distribution: South Africa, only found in the Cape Province.

Species parasitic on the **Umbelliferae.**

62. **Puccinia Alepideae** n. sp.

III. Teleuto-sori amphigenous, mostly hypophyllous, on indeterminate purplish-brown leaf-spots, scattered or in groups, minute, dark brown, pulverulent, surrounded by the torn epidermis. Teleutospores golden-brown, sub-globose or broadly ellipsoid, broadly rounded at both ends, not constricted or very slightly so, 28–37 × 21–30 μ; epispore 2·5–3 μ thick, very slightly thickened (up to 5 μ) at the apex, irregularly and sparsely verruculose, warts more numerous on the upper half; germ pores papillate, apical or slightly oblique in the upper cell, and in the lower about one-third of the distance from septum to base; pedicel hyaline, fragile, up to 40 μ long, sometimes inserted obliquely.



Puccinia Alepideae.
Teleutospores.

Host: Alepidea sp., on living leaves, Tugela Valley, near Mont aux Sources, 16.5.20, Doidge [14158].

Distribution: Natal.

63. **Puccinia Hydrocotyles** (Link.) Cke.

in Grevillea IX, p. 14; Syd. Monogr. Ured. I, p. 388.

Syn. *Bullaria Hydrocotyles* Arth. and Mains, N. Am. Flora 7, p. 489, 1922.
Caeoma Hydrocotyles Link. Sp. Plant. II, 22.
Trichobasis Hydrocotyles Cke. Jour. Bot. II, 344.
Uredo bonariensis Speg. Fg. Argent. Pug. I, No. 40.

[O. Spermogones ephiphyllous, associated with the aecidia, arranged in small groups, minute, honey-coloured.

I. Aecidia amphigenous, usually equally distributed over the whole leaf surface, rarely solitary or in irregular groups, peridia cupulate, tinted yellow, with deeply incised revolute margins. Aecidiospores angular-globose, 19–28 μ diam., contents pale yellow, epispore hyaline, 1 μ thick, punctate.]

II. Uredo-sori amphigenous, scattered or confluent, often circinate, long covered by the epidermis, later becoming naked, pulverulent, cinnamon-brown. Uredospores sub-globose or ellipsoid, 24–34 × 20–28 μ; epispore cinnamon-brown, 2–2·5 μ thick, echinulate, with two conspicuous germ pores.

[III. Teleuto-sori dark brown, similar to the uredo-sori. Teleutospores ellipsoid or oblong-ellipsoid, rounded at both ends, not or very slightly thickened at the apex, slightly constricted, smooth or very delicately verruculose, brown, 30–44 × 18–28 μ; pedicel hyaline, slender, deciduous.]

Hosts: Hydrocotyle bonariensis Lam., on living leaves, Amanzimtoti, Natal, 10.7.11, Doidge [1633]; Catembe, Portuguese East Africa, 21.9.08, Howard [512].

Hydrocotyle verticillata Thun., Port Elizabeth, Cape Province, 14.12.12, Pole Evans [5189].

Distribution: Natal, Europe, North and South America, New Zealand, Pacific Islands.

Only the uredospores are to be found on the South African specimens; the original Natal specimen collected by Medley Wood, from which Cooke described the teleutospores (Grevillea l. c.) is missing from our collection, so that Sydow's description of the teleutospores is quoted.

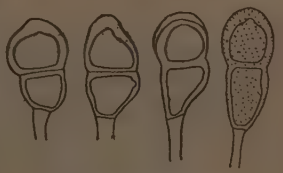
The aecidium has been recorded only from South America and New Zealand (Cunningham, The Uredinales or rust-fungi of New Zealand I, p. 668). In Europe the teleutospores are rare, only a few occurring in the uredo-sori; teleutospore material is New Zealand.

Species parasitic on the **Oenotheraceae.**

64. **Puccinia Krookii** P. Henn.

in Annal, Naturhist. Hofmus. Wien., 1900, p. 1; Syd. Monogr. Ured. I, p. 426.

II. Uredo-sori amphigenous, scattered, minute, round or lenticular, surrounded by the torn epidermis, pulverulent, cinnamon brown. Uredospores globose, ovate or ellipsoid, 18–30 × 16–24 μ; epispore 2·5–3·5 μ thick, pale golden brown, delicately aculeate, and with two equatorial germ pores.



Puccinia Krookii. Teleutospores.

III. Teleuto-sori similar to the uredo-sori, but cinnamon-brown, often very numerous and becoming confluent. Teleutospores ellipsoid, sub-clavate or pyriform, rounded at the apex, upper cell chestnut-brown, lower cell paler, slightly constricted, attenuate into the pedicel towards the base, rarely rounded, 30–43 × 16–20 μ; epispore punctate, 1–1·5 μ thick in the lower cell, up to 3 μ thick in the upper, and slightly thickened (up to 6 μ) at the apex; germ pores apical or slightly oblique in the upper cell, and one-half to one-third of the distance from septum to base in the lower; pedicel delicate, hyaline, up to 40 μ long.

Host: Epilobium hirsutum L., near Silverton, Pretoria District, 24.5.11, Doidge [1523]; Rietfontein, Pretoria District, 16.5.12, Doidge [2307]; Kentani, Cape Province, 7.2.16, Pegler 2395 [9530].

Distribution: South Africa.

P. Krookii was described by Hennings from material collected at Harrismith in the Orange Free State. It differs from P. pulverulenta Grev. in having larger teleutospores, which are usually attenuated into the pedicel at the base, and which have a punctate epispore.

65. **Puccinia Oenotherae** Vize.

in Grevillea V, p. 109 (1877); Syd. Monogr. Ured. I, p. 434.

Syn. *Puccinia Boisduvaleae* Peck. in Bot. Gazette, 1882, p. 45; Sacc. Syll. Fung. VII, p. 699.

Dicaeoma Epilobii-tetragoni Arth. N. Am. Flora 7, p. 394, 1920.

II. Uredo-sori amphigenous, scattered, minute, round, pulverulent, light brown. Uredospores globose, sub-globose or broadly ovate, light brown, 18–27 μ diam.; epispore light brown, about 1·5 μ thick, delicately echinulate, and with two equatorial germ pores.

Puccinia Oenotherae.
Teleutospores and one mesospore.

III. Teleuto-sori amphigenous, similar to the uredo-sori, but dark brown. Teleutospores oblong, rounded or bluntly conical at the apex and darker brown than the rest of the spore, constricted at the septum, rounded at the base or rarely attenuate, 30–42 × 16–22 μ; epispore smooth, strongly thickened at the apex (up to 10 μ); germ pore apical in the upper cell, just below the septum in the lower; pedicel sub-hyaline, persistent, about 6 μ thick and up to 50 μ long.

X. Mesospores not numerous, ellipsoid.

Hosts: Oenothera sp., Wellington, Cape Province, 11.11.10 and 22.2.12, Doidge [984 and 2065]; Newlands, near Capetown, 26.12.12, Saxton [5578]; Bloemfontein, 4.12.17, Potts [11305].

Distribution: South Africa, North America.

Species parasitic on the **Guttiferae.**

66. **Puccinia Hyperici** n. sp.

I. Aecidia amphigenous, mostly hypophyllous, in small irregular groups, pale yellow, minute, cupulate, 240–280 μ diam.; margin of the peridium white, somewhat recurved, laciniate; cells of the peridium firmly joined together, rhomboid to polygonal, imbricate, 30–35 × 16–18 μ, outer wall striate, 6–7 μ thick, inner verruculose, 3–4 μ thick. Aecidiospores angular-globose to ellipsoid, sub-hyaline, 13–18·5 μ diam.; epispore delicate, less than 1 μ thick, delicately verruculose.

Puccinia Hyperici.
Teleutospores and one mesospore.

III. Teleuto-sori amphigenous, chiefly hypophyllous, in irregular groups, mixed with the aecidia, minute, crowded, dark brown, almost black, pulverulent, surrounded by the ruptured epidermis. Teleutospores clavate, chestnut-brown at the apex, paler below, rounded, rarely sub-acute or truncate at the apex, attenuate at the base, not constricted at the septum or very slightly so, 33–50 × 13–22 μ; epispore smooth, about 1·5 μ thick, except at the apex, where it is very strongly thickened (up to 15 μ); germ pore in upper cell apical or slightly oblique, obscure in the lower cell; pedicel persistent, sub-hyaline, up to 18 μ long.

Host: Hypericum sp., I and III, on leaves, Garstfontein, Pretoria District, 12.10.13, Pienaar [7087].

Distribution: Transvaal.

Species parasitic on the **Malvaceae.**

67. **Puccinia abutili** Berk. et Br.

in Fungi of Ceylon n 816; Journ. Linn. Soc. 1873; Syd. Monogr. Ured. I, p. 471.
Syn. *Puccinia carbonacea* Kalch. et Cke. Grevillea. XI, p. 24; P. Henn. Engl. Bot. Jahrb., 1893, XVII, p. 14.

III. Teleuto-sori amphigenous, usually hypophyllous, on round or irregular leaf-spots, which become yellowish-brown; powdery, surrounded by the torn epidermis, reddish-brown, scattered, arranged concentrically and forming by confluence round blotches up to 6 mm. diam., or following the veins and becoming more elongated. Teleutospores oval or broadly ellipsoid, brown, cells equal, rounded at both ends, not constricted, 30–40 × 23–27 μ; epispore minutely verrucose, 3·5–5 μ thick, not thickened at the apex; pedicel hyaline, short, completely deciduous, or breaking off just below the spore; germ pore apical, and in lower cell just to one side of the pedicel.

Puccinia Abutili.
Teleutospores and one mesospore.

Hosts: Abutilon indicum L. on leaves, Umbelusi River, Portuguese East Africa, 22.7.08, Howard [527].

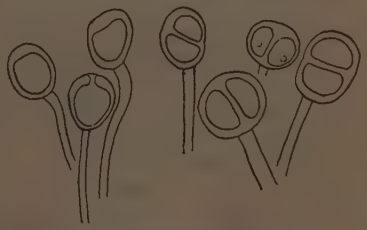
Abutilon Sonneratianum Cav., on leaves and stems, Boschberg, Cape Province, MacOwan, 1878 [3459] (Rabh. Fung. Eur. 3120); Beaufort West, March, 1907 [304]; Oliphants River Tank Transvaal, 14.1.18, Pole Evans [11022].

Distribution: South and Central Africa, Ceylon.

68. **Puccinia heterospora** Berk. et Curt.

in Jour. of Linn. Soc. X, p. 356 (1868); Syd. Monogr. Ured. I, 472.
Syn. *Uromyces pulcherrimus* B. and C. Grevillea III, p. 56 (1874).
U. Sidae Thuem. Rev. Mycol. 1879, p. 10.
U. Thwaitesii B. et Br. Journ. Linn. Soc. XIV, p. 92 (1875).
U. Malvacearum Speg. Fg. Argent. n. 71 et Fg. Guaranit I No. 122.
Puccinia heterospora B. et C., β. *pulcherrima* (B. et C.) Lagh. Ured. Herb El. Fries, p. 61.
P. Thwaitesii Wint. Hedw. 1883, 130.
Micropuccinia heterospora Arth. and Jackson, Bull. Torrey Bot. Club, 48, p. 41, 1921.

III. Teleuto-sori hypophyllous on round or irregular leaf-spots, which become yellowish or brown; single sori minute, dark brown, early becoming naked, scattered sori attaining a diameter of 1 mm., most frequently the minute sori are arranged concentrically and become confluent to form a raised brown cushion up to 10 mm. diam. Bicellular teleutospores few in number and irregular in shape and size, brown, oval or sub-spherical, rounded at both ends not constricted, or very slightly so, 18–27 μ diam.; pedicel hyaline, persistent, often attached obliquely or transversely, up to 10 μ long, 4–5 μ broad below the spore and tapering towards the base; epispore smooth, 2–3 μ thick, 5–6 μ thick at the apex; germ pores obscure.



Puccinia heterospora.
Teleutospores and mesospores.

X. Mesospores extremely numerous, sub-spherical, oval or somewhat angular, brown, 16–22 μ diameter, or up to 27 × 14 μ; epispore smooth, 2–3 μ thick, much thickened at the apex (up to 6·5 μ); pedicel hyaline, persistent, up to 110 μ long; germ pore apical.

Hosts: Sida longipes E. Mey., Garstfontein, Pretoria District, 11.4.11, Doidge [1377].

Sida cordifolia L., Umbelusi, Portuguese East Africa, 18.4.09, Howard [622]; Lourenço Marques, 27.4.09, Howard [675 and 676]; Durban, 11.4.14, Bottomley [8243]; Louis Trichardt, Transvaal, 8.4.19, Putterill [11834]; Durban, April, 1919, Bottomley [12234]; Westfalia, Northern Transvaal, 9.1.25, Doidge [20342].

Sida rhombifolia L. Verulam, Natal, February, 1879, Medley Wood [11113, 11166, 13078]; Entumeni, Zululand, June, 1916, Haygarth [14193].

Distribution: South and tropical Africa, East India, Australia, Philippine Is., China.

The hosts are indigenous, Sida cordifolia being common throughout the tropics. A number of species of Sida are common weeds in cultivated lands.

69. **Puccinia Malvacearum** Mont.

in Gay. Hist. Chile VIII, 43 (1852); Syd. Monogr. Ured. I, p. 476.

Syn. *Puccinia Alceae* Roum. in Sched.

Micropuccinia Malvacearum Arth. et Jackson, Bull. Torrey Bot. Club, 48, p. 41, 1921.

Puccinia malvacearum. Teleutospores.

III. Teleuto-sori amphigenous, mostly hypophyllous, and also on the stems and petioles, on conspicuous yellow or yellow-brown spots, scattered, but close together, hemispherical, pulvinate, hard, compact, at first cinnamon-brown, covered, later reddish-brown, naked, up to 2 mm. diam., or on stems oval to elliptical. Spores oblong to sub-fusoid, tapering to both ends or rarely rounded at the apex, slightly constricted at the septum, 35–75 × 12–26 μ, yellowish-brown, cells approximately equal; epispore smooth, 2–3 μ thick, thickened up to 10 μ at the apex; pedicel persistent, hyaline, stout, short, or up to 150 μ long and 10 μ thick, frequently 90–100 μ long and 6 to 7 μ thick; germ pore of upper cell apical or just to one side of apex, conspicuous, basal pore immediately below septum, conspicuous, frequently papillate.

X. Mesospores rare, oval to fusiform, 27–45 × 17–20 μ; apex thickened.

Hosts: Althaea rosea (L) Cav., Pretoria, 19.4.06 [18]; Johannesburg, 21.6.07, Fuchs [382]; Skinner's Court, Pretoria, 22.6.11, Pienaar [1652]; Sterkfontein, Orange Free State, 6.1.12, Pienaar [2090]; Groenkloof, Pretoria, December, 1915, Sellschop [9432]; Natal, Medley Wood 455 [10487]; Pretoria, 16.4.23, Gower [17077]

Malva parviflora L., Kentani, 12.12.11, Pegler [2000]; Uniondale, Cape Province, 26.5.12, Pienaar [2419].

Malva rotundifolia L., Somerset East, Medley Wood 440 [10485]; Skinner's Court, Pretoria, 17.7.07 [397]; Pretoria, 23.7.24, Bottomley [19846].

Malvastrum grossulariaefolium Grey. and Harv., 3.1.11, Ventersdorp, Transvaal, Pienaar [1064].

Distribution: Cosmopolitan.

Exceedingly common throughout South Africa on cultivated hollyhocks, and on introduced weeds belonging to the genus Malva.

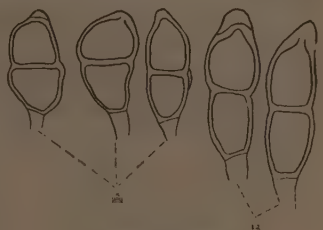
This is a favourite type for the study of the basidiospores, the teleutospores germinating immediately without a resting period. It is one of the few species of the Uredineae which is truly plurivorous, attacking at least forty species of ten different genera of the Malvaceae.

Species parasitic on the **Euphorbiaceae.**

70. **Puccinia Acalyphae** n. sp.

II. Uredospores not numerous, a few being mixed with the teleutospores, broadly ellipsoid, pale yellow, 26–30 × 20–24 μ; epispore thin, pale yellow, very delicately and sparsely echinulate.

III. Teleuto-sori amphigenous, not on leaf-spots, minute, scattered or in irregular groups, round to lenticular, long covered by the epidermis, at length naked, pulverulent, cinnamon-brown. Teleutospores pale golden-brown, ellipsoid or clavate, very variable in form and size, often angular and asymmetrical, not constricted or slightly so, the cells falling apart very readily, attenuate at the base, rounded or conical at the apex or produced into a hyaline papilla which is often oblique, 26–56 × 13–23 μ; epispore thin (1–1·5 μ), smooth, not thickened at the apex, very slightly thickened (about 3·5 μ), or produced into a hyaline or sub-hyaline papilla (up to 10 μ); germ pores apical and just below the septum, papillate; pedicel hyaline, deciduous, 6–8·5 μ thick and up to 50 μ long.



Puccinia Acalyphae.
Teleutospores.
A=2309.
B=14157.

Host: Acalypha angustata Sond., on leaves, the Willows, Pretoria District, 18.5.12, Pole Evans [2309]; near Mont aux Sources, Natal, 13.5.20, Doidge [14157].

Distribution: Transvaal and Natal.

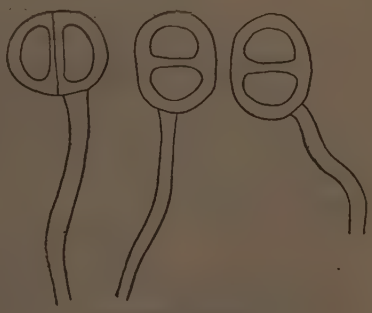
This is very distinct in the form of the teleuto-sori and spores from Puccinia Evansii, which also occurs on the leaves of the Pretoria collection [2309]. The spores are extremely variable in form and size; in the above mentioned material, they are 26–33 × 13–23 μ with a rounded apex or a small papilla; the Natal collection has longer spores, 25–56 × 13–22 μ, with a very marked papilla (up to 10 μ), and should possibly be regarded as a variety, but further collections will have to be studied before this point can be decided.

71. **Puccinia Evansii,** P. Henn.

in Engl. Bot. Jahrb. XLI (1908), p. 271; Sacc. Syll. Fung. XXI, p. 670.

II. Uredospores not numerous, mixed with the teleutospores, sub-globose or broadly ellipsoid, 20–23 × 23–25 μ; epispore 1·5–2·5 μ thick, golden-brown, delicately and rather sparsely echinulate, and with three to five germ pores on one face.

III. Teleuto-sori amphigenous, irregular in outline, surrounded by the torn epidermis, scattered or in irregular groups, dark brown, up to 2 mm. diameter, raised, farinose. Teleutospores broadly ellipsoid to sub-globose, golden-brown to chestnut-brown, broadly rounded at both ends, not constricted at the septum or slightly so, 30–43 × 20–30 μ; epispore 5–6·5 μ thick, not thickened at the apex, very delicately verruculose; germ pores apical, and about half way between septum and base; pedicel persistent, hyaline to flavescent, slender, flexuose, insertion longitudinal, oblique or transverse, up to 200 μ long, 5–6·5 μ thick just below the spore and tapering to the base.



Puccinia Evansii.
Teleutospores.

Hosts: Acalypha angustata Sond., The Willows, Pretoria, 18.5.06 [126]; Garstfontein, Pretoria District, 11.3.11, Pienaar [1372, 1457]; Koodoo's Poort, Pretoria, 12.5.11, Pole Evans [1511]; Garstfontein, Pretoria District, 15.2.12, 3.5.13, and 14.5.13, Pienaar [2146, 6597, 6653]; Olifantsfontein, Transvaal, 4.4.20, Pienaar [13019]; Pretoria, 18.5.12 (Syd. Fung. exot. exsicc. No. 466) [17316].

Acalypha decumbens Thun., The Wilderness, George, 10.5.23, Doidge [17126].

Acalypha punctata Meisn.. Koodoo's Poort, Pretoria, 1.4.11, Pole Evans [1303]; Lyttelton Junction, 3.4.19, Collyer [12226].

Acalypha spp., Silverton, Pretoria District, 30.3.12, Van der Bijl [2226]; Scottsburg, Natal, 5.7.13, Pole Evans [6826]; Greytown, Natal, 4.4.14, Doidge [7820]; Henley, Natal, 24.5.15, Doidge [9092]; Kaalfontein, Pretoria District, 9.3.16, Pole Evans [9536]; New Hanover, Natal, 24.3.17 [10092].

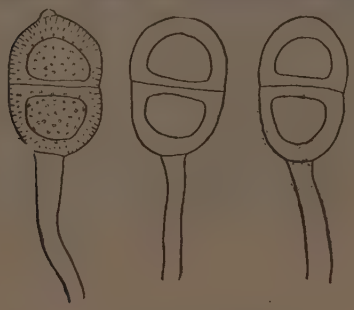
Distribution: South Africa.

Hennings does not mention the uredospores, nor the delicate markings on the epispore which are only visible when the spore is dry. There is no evidence to connect the teleutostage of P. Evansii with the aecidium which has been found on the same host.

72. **Puccinia Tragiae** Cke.

in Grevillea X, p. 125; Syd. Monogr. Ured. I, p. 458.

I. Aecidia amphigenous, mostly hypophyllous, without leaf-spots or on small brownish spots, solitary or in irregular groups of 5–6, cupulate, 250–300 μ diam.; margin of the peridium white, denticulate; cells of the peridium loosely connected and soon falling apart, oblong or sub-rhomboid, 20–40 × 10–16 μ, outer wall striate, 4–5 μ thick, inner wall verruculose, 3–4 μ thick. Spores globose to ellipsoid, angular, subhyaline, 17–25 × 13–17 μ, epispore about 1 μ thick, delicately verruculose.



Puccinia Tragiae.
Teleutospores.

III. Teleuto-sori amphigenous, usually hypophyllous, sometimes on insignificant brown or yellow leaf-spots, usually scattered, more rarely in irregular groups and becoming confluent, pulverulent, at first cinnamon, then dark brown. Teleutospores broadly ellipsoid, chestnut-brown, rounded at the apex and occasionally with a very minute, sub-hyaline papilla, rounded or very rarely slightly attenuate at the base, not constricted at the septum or very slightly so, 30–50 × 20–33 μ; epispore usually 6–6·5 μ thick, rarely up to 8 μ, not thickened at the apex, conspicuously punctate; germ pores one third of the distance from apex to septum and from base to septum; pedicel hyaline, persistent, slender, flexuous, about 5 μ thick and up to 120 μ long, insertion occasionally oblique or even transverse.

X. Mesospores not numerous, sub-globose to ellipsoid.

Hosts: Tragia spp. Inanda, Natal, July, 1881, Medley Wood, 628, 631, 353 [10315, 10512, 11157]; I, Greytown, Natal, 15.4.94, Medley Wood [820]; III, Lemana, Northern Transvaal, August, 1911, Doidge [1798]; I, Isipingo, Natal, 13.5.13, Doidge [6644]; I, Kentani, Cape Province, 31.3.15, Pegler 2306 [8949]; I, Krantzkloof, Natal, 16.5.15, Doidge [9083].

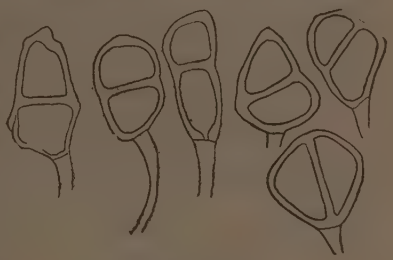
Distribution: South Africa, Abyssinia, Somaliland.

The punctations of the epispore are not mentioned by Sydow (*loc. cit.*), but are very distinct on the spores examined. The material from the Northern Transvaal has rather smaller spores and longer pedicels than the Natal collection. The aecidium has been found from March to May, and the teleuto-sori during July and August.

Species parasitic on **Rutaceae.**

73. **Puccinia Fagarae** n. sp.

III. Teleuto-sori on brown leaf-spots which are usually elongated and involve all the tissue between two lateral veins, hypophyllous, in irregular groups, minute, surrounded by the raised epidermis, which forms a ridge round the sorus with much the appearance of a peridium, black, pulverulent. Teleutospores very variable in form, ellipsoid, sub-globose or quite irregular, and usually angular as a result of lateral compression, apex truncate, sub-rounded or more or less angular, base rounded or occasionally attenuate, not constricted at the septum or slightly so, dark chestnut-brown, 27–50 × 16·5–27 μ; epispore smooth, 3–3·5 μ thick, not thickened at the apex; germ pores obscure; pedicel slender, persistent, insertion often oblique or transverse, hyaline except at the apex where it is tinged with brown, up to 100 μ long.

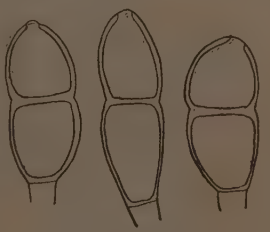


Puccinia Fagarae.
Teleutospores.

Host: Fagara Davyi Verdoorn, on leaves, Pirie Forest, King Williams Town, 8.9.19, Doidge [12274].

74. **Puccinia lemanensis** n. sp.

III. Teleuto-sori on yellowish leaf-spots, hypophyllous, in groups of 5 to 30, deeply seated in the leaf tissues and remaining covered almost indefinitely, raised, pale fuscous. Teleutospores very pale, straw-coloured, clavate or ellipsoid, rounded at the apex, more or less constricted at the septum, attenuate or somewhat rounded at the base, 46–64 × 20–26 μ; epispore thin, smooth, 1·5–2 μ thick, not thickened at the apex; upper germ pore apical, papillate, lower obscure; pedicel hyaline, persistent, but very delicate and thin-walled, and soon collapsing, up to 40 μ long by 13 μ broad.



Puccinia lemanensis.
Teleutospores.

Host: Toddalia aculeata Lam., Lemana, near Louis Trichardt, Northern Transvaal, 20.8.08, Pole Evans [497]; same locality, 14.8.11, Doidge [1795].

Distribution: Transvaal.

75. **Puccinia kentaniensis** Pole Evans.

in Ann. Bolus Herb. II (1917), p. 110.

III. Teleuto-sori amphigenous or on the petioles, mostly hypophyllous, often following the veins, on raised, roughened, light brown corky excrescences, 600–800 μ high, round to irregular in shape and up to 3·5 mm. diam.; these are often very numerous and become confluent, sori very minute, up to 200 μ diam., spherical, embedded in the corky mass and long remaining covered. Teleutospores pale chestnut-brown, ellipsoid or irregular in outline, often angular by compression, usually rounded at the base and apex, rarely attenuate at the base, very delicate and easily crushed, slightly constricted at the septum, 27–37 × 13–17 μ; epispore smooth, often thicker in

Puccinia kentaniensis.
Teleutospores.

upper loculus than lower, but not thickened at the apex, usually 1·5–2 μ thick, sometimes up to 3 μ; germ pores obscure; pedicel short, hyaline, deciduous.

Host: Vepris lanceolata Don., on leaves, Kentani, Cape Province, 29.11.14, Pegler 1960 [8793 and 8841].

Distribution: Transkei.

The corky excrescences in which the teleuto-sori are embedded very much resemble insect galls, and might be passed over as such by the mycologist.

Species parasitic on **Geraniaceae.**

76. **Puccinia Monsoniae** (Syd.) Doidge n. sp.

Syn. *Uredo Monsoniae* Syd. in Ann. Myc. X (1912), p. 34; Monogr. Ured. IV, p. 467.

II. Uredo-sori amphigenous, scattered, minute, yellow-brown. Uredospores subglobose, ellipsoid or oblong, 17–25 × 10–20 μ; epispore golden-brown, 1·5–2 μ thick, briefly and delicately echinulate, and with three equatorial germ pores.

Puccinia Monsoniae. Teleutospores.

III. Teleuto-sori amphigenous, scattered, minute, dark brown, pulverulent, surrounded by the torn epidermis. Teleutospores golden-brown, darker at the apex, clavate, elongated or ellipsoid, straight or slightly curved, apex rounded, sub-acute or flattened, base attenuate or more rarely rounded, constricted at septum, 43–60 × 16·5–26 μ; epispore smooth, about 2 μ thick, thickened at the apex up to 8·5 μ; germ pores apical and just below septum; pedicel pale brown, short, persistent, up to 17 × 6·5 μ.

Hosts: Monsonia attenuata Harv., Ermelo, 20.2.06, Burtt Davy [65].

Monsonia biflora D.C., Lyttleton Junction, Pretoria District, 30.4.11, Miss Erasmus [1518]; The Thorns, Pretoria District, 24.5.11, Doidge [1521]; Koodoos Poort, Pretoria District, 17.7.11, Pearson [1619]; Hennops River, Pretoria District, 27.4.12, Pole Evans [2260]; Silverton Kopjes, Pretoria District, 17.1.15, Pole Evans [8925]; Wonderboom, Pretoria District, 13.4.15, Pole Evans [8974].

77. **Puccinia granularis** Kalch. et Cke.

in Grevillea XI, p. 22; Syd. Monogr. Ured. I, p. 470.

Syn. *Aecidium Pelargonii* Thuem in Flora, 1877, p. 411.

Uredo Pelargonii Thuem in Myc. univ. No. 955.
Puccinia Pelargonii (Thuem) Syd. Monogr. Ured. I, p. 469.

O. Spermogones epiphyllous, in small groups, honey-coloured.

I. Aecidia hypophyllous, on pale indeterminate leaf-spots, developing centrifugally in closely crowded groups, which are usually more or less round and up to 7 mm. diam., or may be elongated along a vein, minute, 300–350 μ diam., cupulate, yellow; peridium white, erect or reflexed, margin lacerate or crenate; cells of the peridium rhomboid, firmly joined together, 20–30 × 13–17 μ, outer wall striate, 6–7 μ thick, inner verruculose, 4–5 μ thick. Aecidiospores angular, globose, or ellipsoid, pale yellow, 20–24 × 16·5–20 μ; wall hyaline, about 1·5 μ thick, very delicately verruculose, contents granular.

II. Uredo-sori hypophyllous, on indefinite leaf-spots, scattered or in groups, elliptical to irregular and up to 1·5 mm. long, at first covered, blister like, later pulverulent, red-brown, surrounded by the torn epidermis. Uredospores yellow-brown, round to ellipsoid, rarely ovate, 23–27 × 20–24 μ; epispore 3–3·5 μ thick, delicately aculeate, yellow-brown, and with two equatorial germ pores.

III. Teleuto-sori hypophyllous, similar to the uredo-sori but darker in colour, teleutospores often mixed with the uredospores in the same sori. Teleutospores light chestnut-brown, darker at the apex, elongated, ellipsoid or clavate, apex truncate, sub-acute or rounded, often oblique, base attenuate, slightly constricted at the septum, 43–80 × 20–23·5 μ; epispore 3–3·3 μ thick, thickened at the apex up to 11·5 μ, smooth; germ pores apical and just below the septum; pedicel persistent, sub-hyaline or yellowish, up to 35 × 6·5 μ.

Puccinia granularis. Teleutospores, uredospores, and one mesospore.

X. Mesospores fairly numerous in some collections, ellipsoid or clavate, thickened at the apex and with an apical germ pore, 30–40 × 13–20 μ.

Hosts: Pelargonium alchemilloides Willd., Somerset East, Cape Province, MacOwan 1154, Rabh. Fung. Eur. 3914 [4254]; also de Thuemen 1026; banks of Umsindusi River, Maritzburg, Natal, 8.4.11, Pole Evans [1438].

Pelargonium aconitiphyllum E. and Z., Belfast, Transvaal, 15.2.09, Doidge [571]; Inanda, Natal, Medley Wood [837]; Lydenburg District, 25.1.11, Pienaar [1075]; Paardeplaats, Lydenburg District, 2.4.11, Pienaar [1498]; Mooi River, Natal, 18.12.11, Walters [2075]; Bulwer, Natal, 3.11.15, Lansdell [9122]; without locality, Mogg [11650]; Mooi River, Natal, 26.10.18, Mogg [11794].

Pelargonium amatybicum E. and Z., Entumeni, Zululand, June, 1916, Haygarth [14189].

Pelargonium cucullatum Ait., St. James, Cape Province, 8.1.12, Stephens [2085]; St. James, 10.12.11, Pole Evans [1981].

Pelargonium tabulare L'Her., Wellington, Cape Province, 11.11.10, Doidge [989].

Pelargonium triste Ait., St. James, Cape Province, 10.12.11, Pole Evans [5569].

Pelargonium spp., Capetown, 19.11.10 and 3.1.11, Lounsbury [994 and 1061]; Lydenburg District, Transvaal, 9.5.14, Pole Evans [8384].

Distribution: South Africa.

Puccinia Morrisoni McAlp. (Rusts of Australia, pp. 180–181, Syd. Ured. No. 2069), is a very closely related species, and it is a question whether it is really distinct from P. granularis.

Sydow (Monogr. Ured. I, pp. 469–470) describes two species of Puccinia occurring on Pelargonium in South Africa, P. Pelargonii, based on MacOwan's collections on Pelargonium alchemilloides (Rabh. Fung. Eur. 3814, Thuem. Myc. univ. 955, 1026) and P. granularis, of which the type is Medley Wood's Natal collection, Aecidium Pelargonii Thuem being connected with the former species through uredospores which occur on the same leaves. The chief difference between the two species as described in the Monograph, is the constantly smaller and thinner-walled uredospores of P. Pelargonii, and the presence of an aecidium in this species.

In examining the abundant collections of Pelargonium rusts in the National Herbarium, it was found that they were readily separable into two groups on the characters of the uredospores, but some confusion has evidently arisen with regard to the type collections, MacOwan's material of Aecidium Pelargonii is associated in the numbers examined with the thick-walled, ellipsoid uredospores of P. granularis.

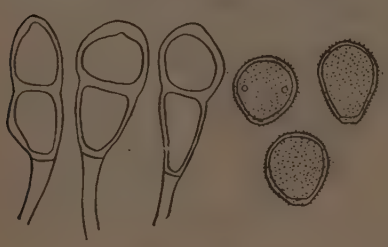
Through the courtesy of the Directors of Kew Herbarium and of the South African Museum, I have been able to examine the original collections of MacOwan as represented in these institutions. At the South African Museum there is plentiful material of two collections on Pelargonium alchemilloides from Somerset East; one collected in 1875 (MacOwan 1154) and the other in 1876 (Aecidium Pelargonii De Thuemen 1026); on both these collections there are numerous uredospores of P. granularis.

The Kew material consists of two numbers, de Thuemen 1026 (Aecidium Pelargonii) on which I could find no uredospores, and de Thuemen 955 (Uredo Pelargonii) with uredospores of P. granularis. It is evident, therefore, that although the differences in the uredospores exist which are indicated by Sydow in his Monograph, P. Pelargonii must be regarded as a synonym for P. granularis, since the type belongs to this species. At the risk of adding to the synonymy it would appear that in order to clear up th confusion it is necessary to describe the type with thin-walled uredospores as a new species; this occurs on cultivated Pelargoniums of the zonale type, and is therefore described as P. Pelargonii-zonalis.

Up to the present P. granularis has only been found on indigenous Pelargoniums occurring in their natural habitats; the aecidium is only known on P. alchemilloides and P. aconitiphyllum. Teleutospores are freely formed, and are distinct from those of P. Pelargonii-zonalis.

78. **Puccinia Pelargonii-zonalis** n. sp.

II. Uredo-sori hypophyllous on very small pale leaf-spots, scattered or closely crowded, secondary sori often forming irregular circles round the primary ones, 0·5–1·5 mm. diam., cinnamon-brown, pulverulent, surrounded by the torn epidermis. Uredospores broadly ovate or sub-globose, yellow-brown, 21–28·5 × 19–21·5 μ; epispore thin, delicately echinulate, 1·5–2 μ thick, slightly thicker at the base, and with two equatorial germ pores, which are small but conspicuous.



Puccinia Pelargonii zonalis.
Teleutospores and uredospores.

III. Teleutospores comparatively rare, mixed with the uredospores, ellipsoid or clavate, pale brown, the upper cell being darker than the lower, rounded or rarely sub-acute at the apex, somewhat rounded, rarely attenuate at the base, slightly constricted at the septum, 36–50 × 16–23·5 μ; epispore smooth, 3 μ thick in the upper cell and very slightly thickened (up to 5 μ) at the apex, 1–2 μ thick in the lower cell; germ pores apical and just below the septum; pedicel hyaline, persistent, rather short, up to 40 × 6·5 μ.

Host: Pelargonium zonale l'Herit, on living leaves, Pretoria, 28.10.05, Pole Evans [111]; Cape Province, 26.11.06, Lounsbury [209]; Pretoria, 9.1.07 and 14.5.06 [216, 128]; Pretoria, 26:6.07, Davis [402]; Woodstock, Alice, Cape Province, October, 1911 [1931]; Umtata, Pondoland, 26.2.12, Pienaar [2222]; Maritzburg, Natal, 7.7.13, Stayner [6823]; Scottsburgh, Natal, 5.7.13, Pole Evans [6843]; Pretoria, 15.5.13, 24.6.13, Pole Evans [6681, 6848]; Cradock, Cape Province, 5.1.14, Leller [7370]; Kentani, Cape Province, 12.8.14 and 7.9.14, Pegler 1946 [8349, 8380]; Cango Valley, Oudtshoorn District, 9.11.17, Doidge [10896].

Distribution: South Africa, Australia, New Zealand.

Cunningham 1368, from Wellington, New Zealand, belongs to this species, and also a Brisbane specimen collected by Burtt. Puccinia Pelargonii-zonalis, occurs on cultivated Pelargoniums of the zonale type (popularly called geraniums). There are no aecidia, and the teleutospores occur rarely, mixed with the uredospores. The uredospores are quite easily distinguished from those of P. granularis by their thinner walls and frequently ovate outline.

Species parasitic on **Leguminosae.**

79. **Puccinia Zorniae** (Diet) McAlp.

in Rusts of Australia, p. 172 (1906).

Syn. *Uredo Zorniae* Berk in Grevillea XX, 1982, p. 110.

II. Uredo-sori amphigenous, but mostly hypophyllous, round to elliptic, scattered or in small groups and sometimes becoming confluent, at first yellowish, covered by the blistered epidermis, later naked, red-brown. Uredospores ovate or ellipsoid, golden-brown, 25–32 × 19–22 μ; epispore golden-brown, about 3 μ thick, delicately echinulate, and with two, rarely three, germ pores, on one face.

III. Teleuto-sori similar to the uredo-sori but dark brown, or teleutospores intermingled with the uredospores. Teleutospores golden-brown, oblong, rounded at base and apex, deeply constricted at the septum, 32–44 × 20–24 μ, average 36 × 21 μ, cells about equal, or lower sometimes a little longer; epispore smooth, slightly thickened at the apex (up to 6 μ); pedicel hyaline, persistent, equalling the spore.]

Host: Zornia tetraphylla Mich., Inanda, Natal, June, 1881, Medley Wood 593 [11112 and 11171]; Dundee, Natal, January. 1910, Doidge [914].

Distribution: South Africa, Mauritius, Australia.

Only the uredo-generation is known in South Africa, the description of the teleuto-sori being taken from MacAlpine. The uredospores differ from those of the American species P. offuscata Arthur, in having only two, rarely three germ pores (see Sydow Monogr. Ured. IV, p. 588).

Species parasitic on the **Rosaceae.**

80. **Puccinia Pruni-spinosae** Pers.

in Syn., p. 226 (1801); Syd. Monogr. Ured. I, p. 484.

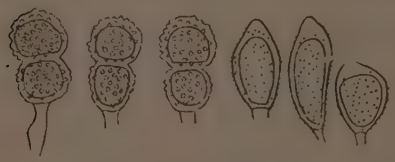
Syn. *Aecidium punctatum* Pers. in Uster. Annal Botanik XX, 135; Plowr. Ured., p. 268.

Ae. quadrifidum D. C. Flor. fr. VI, 90; Cooke Handb., p. 536.
Puccinia Pruni D.C. Flor. fr. ii, 222 (1805); Plowr. Ured., p. 192.
P. Prunorum Link. Sp. Pl. ii, 82 (1825); Cooke Handb., p. 507.
Tranzschelia punctata Arthur., North Americ. Fl. VII, 151.
Uromyces microsorus Kalch. et Cke. Grevillea XI, 1880, p. 18.

[O. Spermogones amphigenous, scattered, brown or blackish, very shallow, punctiform.

I. Aecidia hypophyllous, scattered over the whole surface, flat, with a broad revolute margin which is torn into few (3–5) lobes. Spores sub-globose, pale yellowish-brown, finely verruculose, 16–24 μ diam.]

II. Uredo-sori hypophyllous, grouped on scattered yellow spots which are visible from the upper surface, cinnamon-brown, circular, pulverulent, soon naked, up to 0·5 mm. diam. and surrounded by the ruptured epidermis. Uredospores pale brown, ellipsoid to fusiform, ovoid-oblong or sub-pyriform, 25–38 × 12–18 μ; epispore darker at the apex, smooth and more or less thickened in a conical shape, paler below, about 1·5 μ thick and sharply verrucose or echinulate, with three or four equatorial germ pores; mixed with numerous pale, capitate, paraphyses, which are more or less thickened at the apex.



Puccinia Pruni-spinosae.
Teleutospores and uredospores.

III. Teleuto-sori hypophyllous, similar to the uredo-sori, but dark chestnut-brown. spores chestnut-brown, oblong, ellipsoid or somewhat obovate, 30–45 × 18–26 μ, rounded at base and apex, consisting of two semi-globose cells which separate readily, the basal cell being usually narrower and lighter in colour than the upper, deeply constricted at the septum; epispore closely and coarsely verrucose, 1·5–2 μ thick, thinner in the lower cell, apex thickened up to 6 μ; germ pores apical and one-third of the distance from septum to base, obscure, frequently papillate; pedicel hyaline, very short, deciduous, springing in clusters of about 10–20 from a common base.

Hosts: Prunus amygdalus Stokes, Oorlogsfontein, Potgietersrust, 20.3.23, Gilbertson [17054].

Prunus armeniaca L., Pretoria, 1098 [399]; Wellington, Cape Province, 6.1.11 [1051]; Pretoria, 7.5.23, Bottomley [17091].

Prunus domestica L., Elsenburg, Cape Province, March, 1906, Pole Evans [1]; Lake Chrissie, Transvaal, March, 1911 [1250]; Bethal, March, 1911 [1290]; Queenstown, Cape Province, 19.3.12, Pienaar [2234]; Grahamstown, Cape Province, February, 1912, Gowie [2378]; Pretoria, 7.5.23, Bottomley [17088].

Prunus persica Stokes, Haenertsburg, Transvaal, January, 1906 [106]; Robertson, Cape Province, 24.3.07 [279]; Fort Beaufort, Cape Province, March, 1907 [321]; Pretoria, 9.11.07, Pole Evans [432]; Lourenco Marques, Portuguese East Africa, 25.5.08, Howard [969]; Maracuene, Portuguese East Africa, 2.6.08, Howard [976]; Capetown, 19.2.12, Pearson [2140]; Pretoria, 9.5.12, Van der Bijl [2322]; Pretoria, 31.5.14, Pole Evans [7800]; Cedara, Natal, 8.5.22, Staples [15433]; Pretoria, 7.5.23, Bottomley [17090].

Prunus persica Stokes var. nectarine, Elsenburg, Cape Province, March, 1906, Pole Evans [1. A.]; Pretoria, 7.5.23, Bottomley [17089].

Distribution: South Africa, Europe, North and South America, Australia, New Zealand.

The aecidial stage which occurs on Anemone spp., is not known in South Africa, the description being quoted from Groves (The British rust fungi, p. 208). The complete life cycle was first worked out by Transzchel (1904) and the aecidia are found on several species of Anemone, Hepatica and other Ranunculaceae. Puccinia pruni-spinosae is a very common rust on fruit trees of the genus Prunus, attacking the leaves and twigs and causing considerable damage in some of the fruit growing districts. Viable uredospores may be obtained during nine months of the year and are chiefly responsible for the spread of infection, it is probable that they survive the winter and re-infect the foliage in the following spring.

Anemone capensis occurs fairly common in the South-Western Cape region where the rust is very prevalent, but no aecidium is known to occur on this host.

The type specimen of Uromyces microsorus K. and Cke. (Grey. XI, p. 18), collected by Medley Wood [13079], consists of a few peach leaves showing typical lesions of P. Pruni-spinosae. The uredospores were described as the teleutospores of U. microsorus.

Species parasitic on **Saxifragaceae.**

81. **Puccinia deformans** Wint.

in Flora, 1884, p. 260; Syd. Monogr. Ured. I, p. 494.

II. Uredo-sori closely crowded, completely clothing large areas on the younger branches, and often on the leaves, and deforming them to some extent, long covered by the epidermis which later becomes ruptured, of medium size, at first elliptical, later often confluent and elongated, 0·5–3 mm. long, golden-brown. Uredospores ellipsoid, ellipsoid-oblong or pyriform, 26–40 × 19–24 μ, contents orange coloured; epispore pale, echinulate, about 3 μ thick, parts of the lateral wall being thickened up to 6 μ, with four equatorial germ pores.

III. Teleuto-sori, similar to the uredo-sori and mixed with them. Teleutospores oblong or sub-clavate, dark chestnut-brown, very slightly constricted at the septum, rounded or bluntly acute at the apex, sometimes apiculate, rounded or sub-attenuate at the base, 35–56 × 19–28 μ; epispore smooth, about 3 μ thick, not thickened at the apex or very slightly so; germ pores obscure; pedicel thick, hyaline, swelling up in water to a diameter of 20 μ.

Puccinia deformans Teleutospores.

Host: Montinia acris L., near Capetown, MacOwan (Rabh. Fung. Eur. 3125) [3464]; Clovelly, near Kalk Bay, 4.8.24, Andraea [19857].

Distribution: Cape Province.

Species parasitic on **Crassulaceae.**

82. **Puccinia exanthematica** MacOwan.

in Grevillea XI, p. 24 (1882); Syd. Monogr. Ured. I, p. 490.

III. Teleuto-sori hypophyllous (sometimes there are also a few which are epiphyllous or on petioles), on round leaf-spots which are purplish and up to 7·5 mm. diam., minute, round, arranged in circles on each leaf spot, at first orange coloured, later ochraceous, rather compact. Teleutospores ellipsoid, rounded or sub-acute at the apex, not constricted at the septum, attenuated towards the base or rounded, pale yellow-brown, 24–40 × 14–20 μ; epispore smooth, 2–3 μ thick, usually slightly thickened (up to 6 μ) at the apex, germ pore apical, obscure in lower cell; pedicel persistent, hyaline or yellowish, up to 90 μ long, often flexuous and often inserted obliquely.

Puccinia exanthematica. Teleutospores.

Host: Crassula spathulata Thun., Boschberg Mountains, near Somerset East, September, 1877, MacOwan (Rabh. Fung. Eur. 3209) [3549].

Distribution: Cape Province.

Species parasitic on **Anonaceae.**

83. **Puccinia Popowiae** Cke.

in Grevillea X, p. 126; Syd. Monogr. Ured. I., p. 579; Ann. Myc. XX (1922), p. 57.

I. Aecidia hypophyllous on round to irregular purplish leaf-spots, in irregular groups, cupulate; aecidiospores angular-globose, 13–20 μ diameter, epispore thin, very finely verruculose, hyaline.

III. Teleuto-sori amphigenous, but mostly hypophyllous, not on definite leaf-spots except where they develop amongst the old aecidia, very minute, closely crowded in groups and soon becoming confluent, black, pulverulent, surrounded by the torn epidermis. Teleutospores chestnut-brown, broadly ellipsoid to sub-globose, broadly rounded at base and apex, rarely sub-attenuate at the base, constricted at the septum, 20–33 × 16–20 μ; epispore 2·5–3 μ thick, irregularly and rather sparsely aculeate, not thickened at the apex; germ pores obscure; pedicel persistent, sub-fuscous, up to 17 μ long, 5 μ thick near spore and tapering towards the base, insertion often oblique and occasionally transverse.

Puccinia Popowiae.
Teleutospores.

Host: Popowia caffra H. and S., Inanda, June, 1887, Medley Wood (Wood 614) [10499]; Winters Kloof, Natal, 13.9.19, Doidge [12433].

Distribution: South Africa.

The host is a straggling shrub common in the natural bush throughout the Union. I have not been able to find uredospores, which are mentioned in the original description; only very old aecidia are present on the material available so that the description of this stage is incomplete. Medley Wood's material has been examined by Sydow (Ann. Myc. *loc. cit.*); he considers that the peridial cells are of unusual form, resembling the spores very closely, being only slightly larger and more definitely verruculose. The spores are 12–14 μ and the peridial cell 18 μ in diameter. Younger material is required before these aecidia can be studied in detail.

Species parasitic on **Caryophyllaceae.**

84. **Puccinia Behenis** Otth.

in Mitth. Naturforsch. Gesell. Bern. (1870), p. 89; Grove. British Rust Fungi, p. 222.

Syn. *Aecidium Behenis* D. C. Flora. fr. VI, 94, p.p.

Puccinia Silenes Schrot. in Winter Pilze, p. 125 (1884); Syd. Monogr. Ured. I, p. 559.

[O. Spermogones in small clusters, honey-coloured.

I. Aecidia hypophyllous, on pallid-yellow spots, in orbicular clusters, minute, shortly cylindrical, with whitish torn margin; spores angular-globose, delicately verruculose, orange, 17–26 × 14–20 μ or 15 μ diam.]

II. Uredo-sori amphigenous, scattered or circinate, sometimes confluent, on paler spots, minute, cinnamon-brown. Uredospores sub-globose to ellipsoid, echinulate, pale brown, 20–26 × 17–22 μ, with three or four germ pores.

Puccinia Behenis.
Teleutospores.

III. Teleuto-sori, similar to uredo-sori, but dark brown, Teleutospores oblong to ellipsoid, rounded at both ends, slightly constricted, surmounted by a small, pale, apical papilla, chestnut-brown, 25–40 × 16–26 μ; epispore smooth, delicate, about 1·5 μ thick, not thickened at the apex; germ pore in the upper cell apical or one-third of the distance from apex to septum, in the lower cell one-half to two-thirds of the distance from septum to base; pedicel short, hyaline, deciduous.

Host: Silene sp., Cradock, Cape Province, 5.10.09, Lounsbury [944].

Distribution: South Africa, Central and Western Europe.

The host is a weed in cultivated land. The aecidia are unknown in South Africa.

Species parasitic on **Aizoaceae.**

85. **Puccinia Galeniae** Diet.

Syd. Monogr. Ured. I, p. 562.

II. Uredo-sori amphigenous, scattered, minute or of medium size, dull brown. Uredospores globose, sub-globose or often ellipsoid, yellow-brown, 18–29 × 18–22 μ; epispore thick, briefly echinulate, with four germ pores.

III. Teleutospores mixed with the uredospores, ovate, rounded at the apex which is somewhat thickened, slightly constricted at the septum, smooth, brown, about 30–22 μ; pedicel about equal in length to the spore.

Hosts: Galenia africana L. and G. Sarcophylla Fenzl., Swakopmund, South-West Africa.

Distribution: South Africa.

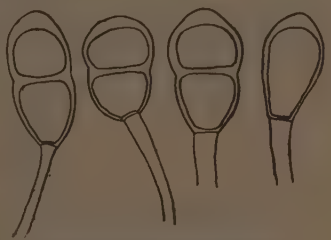
I have not seen this species and can only quote the description given by Sydow (*loc. cit.*)

86. **Puccinia Mesembryanthemi** MacOwan.

in Grevillea XX, p. 109, et in Trans. S. African. Philos. Soc. II, p. 89; Syd. Monogr. Ured. I, p. 562.

I. Aecidia on the leaves or stems, in closely crowded groups which often surround the stem, cylindrical, orange coloured, 300–400 μ diam. and up to 3 mm. long; margin of the peridium white, lacerate; cells of the peridium firmly connected, oblong, 30–40 × 16–20 μ, outer wall striate 6–7 μ thick, inner wall verruculose, 3–4 μ thick. Aecidiospores globose, sub-angular, pale yellow, 22–27 μ diam; epispore hyaline, delicate, about 1 μ thick, closely and delicately verruculose.

III. Teleuto-sori on the leaves and stems, mostly caulicolous; leaf sori minute; stem sori round to oval, bullate, up to 3 mm. diam., long covered by the blistered epidermis, which later cracks away exposing the black compact sorus. Teleutospores oblong-ellipsoid, occasionally sub-clavate, rounded or sub-acute at the apex, rounded or attenuate at the base, slightly constricted at the septum, chestnut-brown, the upper cell usually darker than the lower, 33–54 × 19–27 μ; epispore smooth, 2·5–3 μ thick, slightly thickened at the apex (up to 8 μ); germ pores apical and just below the septum, obscure; pedicel persistent, sub-hyaline, up to 140 μ long.



Puccinia Mesembryanthemi.
Teleutospores and one mesospore.

Hosts: Mesembrianthemum micranthum Haw., Graaff-Reinet (Wood 437) [10489]; Kimberley, 26.8.12 [5126]; Orange River, near railway station, 28.12.13, Pole Evans [7356]; Kimberley, 19.9.12, Moran (Syd. Fung. exot. exsicc. 157) [17882].

Mesembrianthemum sp. (near M. vescum) Johannesburg, 11.7.21, Knox-Davies [14842].

Distribution: South Africa.

The host of the specimen distributed by Sydow (in his Fung. exotici No. 157) has been compared with specimens in the National Herbarium, and agrees with M. micranthum rather than with M. granulicaule.

Species parasitic on **Polygonaceae.**

87. **Puccinia Polygoni-amphibii** Pers.

Syn., p. 227 (1801); Syd. Monogr. Ured. I, p. 569; Groves British Rust Fungi, p. 227.

Syn. *Aecidium Geranii* D.C., Cooke. Handb., p. 543.

Ae. sanguinolentum Lindr. Myk. Notz. in Bot. Notis, 1900, p. 241.
Dicaeoma Polygoni-amphibii Arth. Proc. Ind. Acad. Sci. 1898, p. 184 (1899).
Uredo Polygonorum D.C. Fl. franç. VI, p. 71.
Trichobasis Polygonorum Berk. Cke. Micr. Fung., p. 226.
Puccinia Polygonorum Link; Cooke Handb., p. 495; Micr. Fung., p. 203.
P. Polygoni Pers. Plowr. Ured., p. 188.

[O. Spermogones few, amphigenous.

I. Aecidia hypophyllous, mostly in concentric groups, on well-marked spots which are deep red or purplish and often surrounded by a conspicuous greenish-yellow zone, sometimes occupying the greater part of a leaf, cupulate, with a much cut, recurved margin; aecidiospores finely punctate-verruculose, yellowish, 18–28 μ.]

II. Uredo-sori amphigenous, more often hypophyllous, scattered, roundish, soon naked, pulverulent, cinnamon-brown. Uredospores ellipsoid to obovate, faintly echinulate, yellowish-brown, 25–28 × 18–21 μ, with 2 germ pores in the upper half.

III. Teleuto-sori chiefly hypophyllous, not projecting, long covered by the epidermis, surrounding the uredo-sori in a circular fashion, dark brown. Teleutospores oblong to clavate, rounded at the apex, and often obliquely conical, more or less attenuate at the base, slightly constricted, yellow-brown, 35–52 × 16–22 μ; epispore smooth, thickened at the apex (7–12 μ); germ pore apical in upper cell, obscure in lower; pedicel nearly hyaline, persistent.

Host: Polygonum tomentosum Willd., Garstfontein, Pretoria District, 11.4.11, Pienaar [1374]; near Dordrecht, 14.1.12, Pienaar [2004]; Uniondale, Cape Province, 26.5.12, Pienaar [2431].

Distribution: World-wide. The aecidium is on Geranium sp., and is not known in South Africa.

Species parasitic on **Santalaceae.**

88. **Puccinia Stonemanniae** Syd. et Evans.

in Ann. Myc. X, 1912, p. 38. 437

Syn. *Aecidium Osyridicarpi* Mass., Kew Bull. 1911, p. 225.

Puccinia pulvinata Mass. (nec. Rabh.) in Kew Bull. 1911, p. 224.
P. Osyridicarpi Grove, Bull. Bot. Gard. Kew, 1916, n. 3, p. 76.

O. Spermogones amphigenous, mixed with the aecidia, 120–160 μ diam.

I. Aecidia amphigenous or often caulicolous, closely crowded or irregularly scattered, on Osyridicarpus, also on the flowers and fruit, and causing a certain degree of hypertrophy and distortion, cupulate or briefly cylindrical, 250–300 μ diam.; margin of the peridium re-curved, white, lacerate; cells of the peridium rhomboid to polygonal, 20–35 × 15–20 μ, outer wall finely striate, 10–18 μ thick, inner wall 4–5 μ thick, delicately and closely verruculose. Aecidiospores angular-globose or ellipsoid, 19–26 × 16–22 μ; epispore 1·5–2 μ thick, delicately verruculose.

II. Uredo-sori amphigenous, or often caulicolous, minute, round or irregular, scattered, cinnamon-brown, remaining covered rather long by the epidermis. Uredospores subglobose, ovate or broadly ellipsoid, brown, 23–30 × 19–20 μ or 21–27 μ diam.; epispore 2·5–3·5 μ thick, densely verrucose, and with 4–5 conspicuous germ pores, which are irregularly placed, but mostly equatorial.

Puccinia Stonemanniae. Teleutospores.

III. Teleuto-sori amphigenous or caulicolous, irregularly scattered, small or of medium size, confluent, round, oblong or irregular, rather compact, dark brown. Teleutospores ellipsoid or oblong, rounded at the apex, rounded or attenuate at the base, slightly constricted at the septum, chestnut-brown, 30–46 × 19–27 μ; epispore smooth, slightly thickened at the apex (up to 6·5 μ); germ pores apical and just below the septum, pedicel stout, persistent, hyaline or sub-hyaline, up to 80 μ long and 6·5 μ thick.

Hosts: Thesium strictum Berg., Wellington, Cape Province, 10.1.11, Stoneman [1057]; Bainskloof, near Wellington, Cape Province, 26.2.11 and 21.2.12, Doidge [1220, 2058]; same locality, 5.4.12, Stoneman [2230].

Thesium impeditum A. W. Hill, Zwartfontein, Vryburg District, 5.5.12, Burtt Davy [2358].

Thesium hystrix A. W. Hill, Kimberley, 26.8.12 [5127]; Koffyfontein, Cape Province, 6.3.16, Schulz [9534].

Osyridicarpus natalensis D.C., Tabamhlope, Natal, 14.10.07, Medley Wood, (Wood 10527) [810 and 818]; Kentani, Cape Province, 12.8.14, Pegler 1944 [8350, 8351, and 8790].

Distribution: South Africa.

The collections on Thesium spp. and on Osyridicarpus correspond so closely that it is impossible to find any specific differences. All stages are present on both hosts, and the aecidio- uredo- and teleutospores agree in every particular. The closely verrucose uredospores with 4–5 germ pores are very distinctive.

Species parasitic on **Orchidaceae.**

89. **Puccinia aurea,** Wint.

in Flora, 1884, p. 260; Syd. Monogr. Ured. I, p. 594.

III. Teleuto-sori amphigenous, on indeterminate leaf-spots, which are at first pale yellow and afterwards become brown, scattered or in groups, minute, punctiform, round, rather compact, yellow-brown, pulverulent. Teleutospores oblong or fusiform, tapering at both ends, strongly thickened at the apex (up to 16 μ), not constricted at the septum or slightly so, smooth, pale yellow, 35–65 × 13–20 μ; pedicel hyaline, persistent, thick, about equalling the spore.

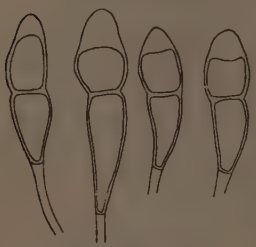
Host: Monadenia comosa Reichb. (=Monadenia rufescens), near Capetown, MacOwan.

Distribution: South Africa.

I have not seen this specimen, the description is taken from Sydow's Monograph (*loc. cit.*).

90. **Puccinia Satyrii** Syd.

in Monogr. Ured. I, p. 594.



Puccinia Satyrii.
Teleutospores.

II. Uredospores mixed with the teleutospores, globose, sub-globose or ellipsoid, 20–27 × 15–20 μ; epispore colourless, 1·5–2 μ thick, echinulate; germ pores obscure, but apparently 3–4, equatorial.

III. Teleuto-sori hypophyllous, not on leaf-spots, usually evenly distributed over the whole leaf surface, minute, round, punctiform, rather compact, yellow-brown. Teleutospores pale yellow, oblong, fusiform or sub-clavate, tapering towards both ends, constricted at the septum, 32–57 × 13–19 μ; epispore smooth, thin (less than 1 μ), strongly thickened at the apex (up to 11 μ), germ pores obscure; pedicel hyaline, persistent, about the same length as the spore.

Hosts: Satyrium carneum R. Br., on dying leaves, near False Bay, September, 1884, MacOwan (Rabh. Fung. Eur. 3614) [3954].

Satyrium neglectum Schltr., Kokstad, East Griqualand, 11.2.20, McLoughlin [12819].

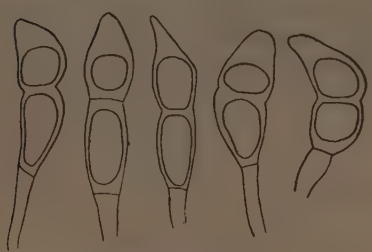
Distribution: South Africa.

Species parasitic on **Iridaceae.**

91. **Puccinia dehiscens** Syd.

in Monogr. Ured. I, p. 597.

II. Uredo-sori amphigenous, on elongated, purplish-black leaf-spots, scattered or in irregular groups, minute, oblong or sub-linear, long covered by the epidermis, which finally slits longitudinally, but still surrounds and partially covers the sorus, yellow-brown. Uredospores globose, sub-globose or broadly ellipsoid, 13–27 μ diam., epispore about 1 μ thick, very closely and finely echinulate, and with 3–4 equatorial germ pores.



Puccinia dehiscens.
Teleutospores.

III. Teleuto-sori amphigenous, scattered or in groups, on elongated purplish-black leaf-spots, oblong or sub-linear, about 1–1·5 mm. long, long covered or partly covered by the epidermis and finally dehiscing through small longitudinal slits, rather compact, but pulverulent, dark brown. Teleutospores oblong or clavate, light brown, rounded, truncate or tapering and conical at the apex, often oblique, constricted at the septum, attenuate at the base, 40–65 × 13–20 μ; epispore smooth, usually about 3 μ thick, very strongly thickened at the apex (8–17 μ), germ pores apical and just below the septum; pedicel yellowish, persistent, rather stout, up to 60 μ long and 6·5–10 μ thick.

Hosts: Aristea corymbosa Bth., Bains' Kloof, near Wellington, Cape Province, 12.11.10, Doidge [966]; on the mountain behind St. James, Cape Province, 22.12.12, Pole Evans [5571].

Aristea sp., Sabie, Lydenburg District, 21.8.12, Pienaar [5146].

Distribution: South Africa.

92. **Puccinia Dieramae** Syd.

in Monogr. Ured. I, p. 597.

II. Uredo-sori amphigenous, in small scattered groups, or more or less evenly distributed over the leaf surface, oblong or oblong-linear, ochraceous, long covered by the epidermis and finally dehiscing by a longitudinal slit. Uredospores globose, sub-globose or frequently ellipsoid, yellow-brown, 24–32 × 16–25 μ; epispore about 3 μ thick, delicately echinulate-verruculose, and with 5–8 scattered germ pores.

III. Teleuto-sori amphigenous, dark brown or black, scattered, or more or less grouped, irregularly or in rows, oblong or oblong-linear, about 0·5–1 mm. long, long covered by the epidermis, and finally dehiscing by a longitudinal slit. Teleutospores light brown, oblong-clavate or clavate, often conical and tapering obliquely, less frequently rounded or truncate at the apex, constricted and easily separating at the septum, attenuate at the base, 43–80 × 14–20 μ; epispore smooth, 2–3 μ thick, very much thickened at the apex (up to 20 μ); germ pores apical and just below the septum, pedicel light yellow-brown, persistent, up to 70 μ long and about 6·5 μ thick.

Puccinia Dieramae.
Teleutospores.

Host: Dierama pulcherrima Baker, Entumeni, Zululand, June, 1916, Haygarth [14178].

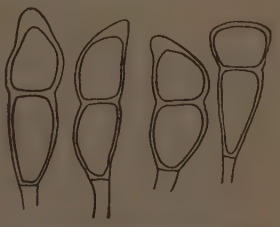
Distribution: South Africa.

Originally collected by Ecklon and Zeyher at the Cape of Good Hope on Dierama ensifolia (=D. pendula Baker). No locality is mentioned (Syd., *loc. cit.*).

93. **Puccinia Gladioli-crassifolii** n. sp.

II. Uredo-sori ochraceous, minute, oblong, scattered or in rows, long remaining covered by the epidermis, and finally dehiscing by a longitudinal slit. Uredospores globose or sub-globose, yellow, 20–24 μ diam.; epispore hyaline, about 2 μ thick, very delicately verruculose-echinulate, and with 5–8 small scattered germ pores.

III. Teleuto-sori similar in form and position to the uredo-sori but dark brown, and remaining covered by the epidermis. Teleutospores oblong, ellipsoid or sub-clavate; at the apex often somewhat acute, straight or oblique, less frequently rounded; more or less constricted at the septum, attenuate at the base, yellow-brown, 33–60 × 16–23 μ; epispore smooth, about 2 μ thick, thickened at the apex up to 10 μ; germ pores apical and just below the septum; pedicel brown, persistent, rather stout, and up to 50 μ long. Paraphyses none.



Puccinia Gladioli-crassifolii.
Teleutospores.

Host: Gladiolus crassifolius Baker., Lyttelton Junction, 3.4.19 Collyer [12227].

Distribution: Transvaal.

Differs from P. Gladioli Cast. in the longer spores, the coloured pedicels and in the absence of paraphyses.

94. **Puccinia Moraeae** P. Henn.

in Hedwigia, 1895, p. 12; Syd. Monogr. Ured. I, p. 600.

II. Uredo-sori amphigenous, scattered over the whole leaf surface, sometimes very numerous and becoming crowded, ellipsoid or oblong, up to 1 mm. long, long covered by the raised epidermis, finally opening longitudinally, ochraceous. Uredospores globose, sub-globose or broadly ellipsoid, yellow 20–27 × 16·5–21 μ; epispore hyaline, about 1·5 μ thick, minutely and closely verruculose-echinulate, and with 8–10 small scattered germ pores.

Puccinia Moraeae.
Teleutospores.

III. Teleuto-sori amphigenous, scattered or in groups, of two kinds, one minute, 0·3–0·6 mm. long, oblong, the other forming a ring up to 2 mm. diam. round an old uredo-sorus, giving the appearance of a black spot with a yellowish centre, both types of sori may occur on the same leaf; sori black, compact, remaining covered by the epidermis, with groups of paraphyses at intervals. Teleutospores very variable in form and size, ovate-oblong, oblong or clavate, rounded, somewhat acute or frequently truncate at the apex, more or less constricted at the septum, attenuate at the base, light brown, with a much darker apex, 30–70 × 13–22 μ; epispore smooth, about 2 μ thick, slightly thickened at the apex (up to 5 μ); germ pores apical and just below the septum; pedicel hyaline or tinged with brown, persistent, short. Paraphyses brown, closely cohering in groups 70–80 μ long.

X. Mesospores more or less numerous, oblong or clavate, 30–40 × 13·5–20 μ.

Hosts: ? Moraea edulis Kar. (very common on living leaves), near Capetown, 1884, MacOwan (Rabh. Fung. Eur. 3204) [3544].

Homeria pallida Bkr., Rooidraai, Lydenburg District, 24.9.09 [692]; Ermelo, Transvaal, 20.10.19 [12461]; Davel, Ermelo District, 20.9.19, Bennet [12460].

Homeria sp., Capetown, 10.10.13, Marloth [17784].

Distribution: South Africa.

The identity of the host, Moraea edulis (Rabh. Fung. Eur. 3204, which is part of the type collection) is open to doubt. It is a much stouter, flatter leaf than any of the specimens of Moraea edulis in the National Herbarium, and is much more like a Homeria leaf.

I think there can be no doubt that all the collections enumerated above should be assigned to the same species; there is considerable variation in the size of the spores, but this often occurs in a single sorus. For instance, in No. 12461, the shortest and the longest and also the narrowest and broadest spores were found.

The Capetown collection [17784] agrees in every respect with Sydow's description of Puccinia melanida (Ann. Myc. 22, p. 235, 1924) described on Homeria collina, collected by Van der Byl at Stellenbosch in the same area. I have not seen the type specimen of P. melanida, but Sydow (*loc. cit.*) states "Die art steht der *Pucc. Moraeae* P. Henn. nahe, besitzt jedoch kürzere und durchschnittlich auch breitere Teleutosporen." The spore measurements given by him are 32–44 × 14–22 μ; spores of these dimensions are to be found in the same sori as the longer teleutospores in the Transvaal collections. It is probable, therefore, that P. melanida must be regarded as a synonym for P. Moraeae.

95. **Puccinia capensis** Diet.

in Hedwigia 44, p. (178) 1905.

III. Teleuto-sori oblong sometimes confluent, pulvinate, long covered by the raised epidermis, at length naked or surrounded by the torn epidermis, black. Teleutospores varying in form, frequently angular or oblique, apex truncate, rounded or conoid, base usually attenuate, more or less constricted at the septum, 30–60 × 20–29 μ, deep yellow-brown or chestnut-brown; epispore smooth and thick, slightly thickened at the apex; pedicel firm, yellow-brown, up to 50 μ long . . .

X. Mesospores present.

Host: Moraea tricuspis Ker., on scapes, Cape of Good Hope, MacOwan.

I have not seen this species; the description is taken from the original.

Species parasitic on **Amaryllidaceae.**

96. **Puccinia Pole-Evansii** n. sp.

II. Uredo-sori amphigenous, on purplish leaf-spots, scattered or in groups, minute, oblong, long covered by the epidermis. Uredospores sub-globose, ovate or broadly ellipsoid, 20–30 × 16·5–22 μ; epispore hyaline, 2–2·5 μ thick, delicately verruculose-echinulate, and with 4–5 scattered germ pores.

Puccinia Pole-Evansii.
Teleutospores.

II. Teleuto-sori amphigenous, on purplish leaf-spots, closely crowded in small groups, minute, black, remaining covered by the raised epidermis. Teleutospores pale fuscous, sometimes darker near the apex,, variable in form and size, oblong, clavate or ellipsoid, apex directly or obliquely acuminate, rounded or somewhat flattened, more or less constricted at the septum, attenuate at the base, 46–77 × 15–23 μ, the majority being 50–60 × 18–20 μ; epispore smooth, 2–3 μ thick, thickened at the apex (up to 13·5 μ); germ pores apical and just below the septum; pedicel persistent, pale fuscous, about 5 μ thick and up to 50 μ long.

X. Mesospores rare.

Hosts: Hypoxis acuminata Baker, Cramond, Natal, 3.6.12, Pole Evans [2408].

Hypoxis costata Baker, Kaalfontein, Pretoria District, 18.4.17, Pole Evans [10983]; Lyttelton Junction, 3.4.19, Collyer [12228].

Hypoxis rigidula Baker, Garstfontein, Pretoria District, 25.3.11, Pienaar [1257] The Willows, Pretoria, 18.5.12, Pole Evans [2332]; Kaalfontein, 18.4.17 and 27.3.17, Pole Evans [10984 and 10084].

Hypoxis spp., Paardeplaats, Lydenburg District, 2.5.11, Pienaar [1502]; Pretoria, 26.4.13, Murray [6614]; Krugersdorp, 26.4.15, Pole Evans [9094]; Mooi River, Natal, 21.3.17, Mogg [10070 and 10071]; Mont aux Sources, 18.5.20, Doidge [14160].

Distribution: Natal and Transvaal.

Differs from Puccinia Hypoxidis McAlp. in the longer paler spores; there is no distortion by the leaves.

Species parasitic on **Liliaceae.**

Anthericum L.

97. **Puccinia polycampta** Syd.

in Ann. Myc. 22, p. 236, 1924.

II. Uredo-sori amphigenous, not on leaf-spots, scattered, elliptical, 0·5–1 mm. long, yellow, long remaining covered, or surrounded by the torn epidermis. Uredospores globose, sub-globose or broadly ellipsoid, 24–27 × 20–25 μ; epispore hyaline or very pale yellow, 1–1·5 μ thick, briefly and closely echinulate and with 8–10 scattered germ pores.

III. Teleuto-sori amphigenous, elliptical or oblong, up to 1 mm. long, frequently confluent, always remaining covered, compact, black. Teleutospores irregularly ellipsoid, ovate oblong or oblong-clavate, frequently angular, rounded or truncate at the apex, more or less constricted at the septum. attenuate or sub-rounded at the base, smooth, yellow-brown, darker at the apex, 36–44 × 18–24 μ; epispore 2–2·5 μ thick, slightly thickened at the apex (4–6 μ); pedicel hyaline or sub-hyaline, short; paraphyses very plentiful, closely united, dark chestnut-brown.

X. Mesospores usually present.

Host: Anthericum sp., Stellenbosch, September, 1923 (Van der Bijl, 1260 and 1270).

Not represented in the National Herbarium.

Asparagus L.

98. **Puccinia Asparagi** D.C.

in Fl. franc. II, p. 595 (1805); Syd. Monogr. Ured. I, p. 615; Grove, British Rust Fungi, p. 233; Fischer, Ured. Schweiz., p. 78.

Syn. *Puccinia Discoidearum* Lk. var. *Asparagi* Wallr. Fl. crypt. Germ. II, p. 222.
P. oxiopus Bon. Coniom., p. 53.
Aecidium Asparagi Lasch. in Klotsch herb. myc., 1179, et Flora 1848, p. 509.
Uredo Asparagi Lasch. in Klotsch herb. No. 1180. et Flora, 1848, p. 509.
Dicaeoma Asparagi Kuntze, Rev. Gen. 3, p. 467, 1898.

[O. Spermogones in small clusters, honey-yellow.

I. Aecidia in oblong groups on the stems, for a long time closed, then briefly cupulate, with a whitish, erect, torn margin. Aecidiospores globose, sub-globose or broadly ellipsoid, delicately verruculose, orange, 28–44 × 25–35 μ.

II. Uredo-sori oblong, narrow, flat, long covered by the epidermis, cinnamon-brown. Uredospores globose to ovate, pale brown, 20–30 × 17–25 μ; epispore delicately and densely echinulate and with 4 germ pores.]

Puccinia Asparagi.
Teleutospores and one mesospore.

III. Teleuto-sori blackish brown, most commonly on the stems, less frequently on the cladodes, elliptic oblong or linear, scattered or in groups and becoming confluent, pulvinate, rather compact. Teleutospores ellipsoid or oblong, rounded at apex and base, not constricted at the septum or very slightly so, brown, 35–52 × 17–26 μ; epispore smooth, 3–3·5 μ thick, thickened at the apex (up to 8 μ); germ pore apical, obscure in lower cell; pedicel hyaline or brownish, persistent, about as long as the spore or up to 140 μ.

X. Mesospores fairly frequent, ellipsoid or obovate.

Hosts: Asparagus Cooperi Bkr., Smitskraal, Boshoff District, June, 1911, Burtt-Davy [20430]; Arcadia, Pretoria, 30.6.25, Doidge [20431].

Asparagus plumosus Bkr., Bloemfontein, 30.4.11, Van der Merwe [1486]; Buffels Drift, Pretoria District, 16.7.11, Pienaar [1645 and 5203]; (= Syd. Fung. Exot. Exsicc. 10); Sterkwater, Pretoria District, 16.11.11, Pienaar [1961].

Distribution: South Africa, Europe, Abyssinia, North America.

Only the teleuto stage is represented in the South African collections, the descriptions of the aecidia and uredo-sori being taken from Sydow and Grove. Fischer (*loc. cit.*) states that the connexion between the aecidium and the other spore forms has not yet been established.

There is no record of the occurrence of this rust on Asparagus officinalis in South Africa, but Asparagus is not yet cultivated to any great extent. The disease is often very destructive to asparagus beds; when it appears all diseased shoots should be gathered and burnt. The best means of prevention is the selection of resistant varieties and the avoidance of over crowding.

99. **Puccinia Myrsiphylli** (Thuem.) Wint.

in Flora, 1884, p. 261, Syd. Monogr. Ured. I, p. 626.

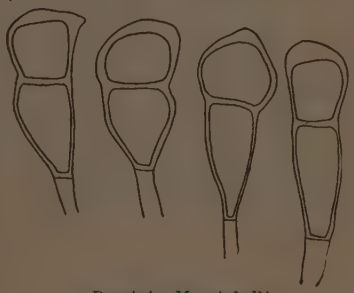
Syn. *Uredo Myrsiphylli* Thuem. in Flora 1877, p. 410.

Aecidium Myrsiphylli Kalch. in Grevillea XI, p. 25.

[I. Aecidia on the under side of the cladode, circinate, on minute, circular, yellow leaf-spots, very short, urceolate, margin of peridium sub-entire. Aecidiospores sub-globose or broadly ellipsoid delicately verruculose, pale yellow, 21–27 μ diam.]

II. Uredo-sori hypophyllous on indefinite yellowish spots, scattered, minute, covered, pale yellow. Uredospores ellipsoid or sub-globose, pale yellow, 34–40 × 26–30 μ; epispore hyaline, about 1·5 μ thick, closely and finely echinulate, and with 4–5 scattered germ pores.

III. Teleuto-sori caulicolous, covered, at length splitting the epidermis longitudinally, but always partly veiled, forming long, grey-black, confluent streaks. Teleutospores oblong, cuneate or clavate, apex rounded, acuminate or truncate, usually attenuate at the base, usually gently constricted at the septum, light brown, darker at the apex, 43–70 × 17–28 μ; epispore smooth, about 1·5 μ thick, thickened at the apex (up to 7 μ); germ pores obscure, pedicel short, fragile, hyaline or tinged with brown.



Puccinia My siphylli.
Teleutospores.

Host: Asparagus medeoloides Thun., Noodsburg, Natal, Medley Wood 219 [832 and 10592]; Harden Heights, Natal, 6.6.11, Fuller [1590].

Distribution: South Africa.

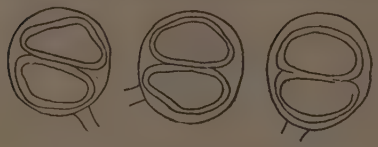
I have not seen the aecidia.

100. **Puccinia Phyllocladiae** Cke.

in Grevillea X, p. 125 (1882); Syd. Monogr. Ured. I, p. 612.

III. Teleuto-sori most frequently on both faces of the cladodes and also on the stems, on pale spots, scattered, or in small groups and becoming confluent, round, 1–1·5 mm. diam., at first rather compact, later, more or less pulverulent, dull brown. Teleuto-

spores or sub-globose, broadly rounded at both ends, not constricted at the septum, 32–45 × 30–40 μ; epispore smooth, 3·5–5 μ thick, not thickened at the apex or slightly so; germ pore in the upper cell usually one-half to two-thirds of distance from septum to apex, in lower cell close to septum or about one-third of distance from septum to base; pedicel hyaline persistent, up to 140 μ long, often curved and frequently inserted obliquely.



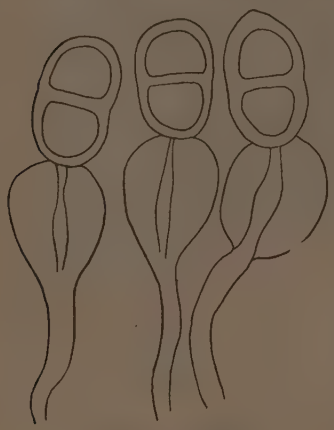
Puccinia Phyllocladiae.
Teleutospores.

Host: Asparagus falcatus L., Inanda, Natal, Medley Wood (Wood 630) [830, 11158, 10497 and 9809]; Winkle Spruit, Natal, 29.11.11, Pole Evans [1977]; 29.1.12, Pole Evans [2022]; 5.6.12, Pole Evans [2395]; 6.7.12, Doidge [2503]; Kentani, Cape Province, 9.12.14, Pegler 1962 [8792].

Distribution: South Africa, Ceylon.

101. **Puccinia ranulipes** n. sp.

II. Uredo-sori on the cladodes, minute, elliptic-oblong, cinnamon-brown, long covered by the epidermis, finally splitting longitudinally, pulverulent. Uredospores ellipsoid, sub-fusoid or ovate, somewhat attenuate towards both ends, rounded or sub-acute at the apex, truncate at the base, 40–60 × 20–25 μ; epispore 2–2·5 μ thick, pale yellow, sparsely verruculose-echinulate in the upper half, lower half almost smooth, with 3–4 equatorial germ pores.



Puccinia ranulipes.
Teleutospores.

III. Teleuto-sori very numerous on the cladodes, minute, black, elliptic, pulvinate, rather compact. Teleutospores ellipsoid or sub-globose, rounded or sub-acute at the apex, rounded at the base, not constricted at the septum or very faintly so, deep chestnut-brown, 40–54 × 23–30 μ; epispore smooth, about 3 μ thick, very slightly thickened at the apex (up to 5 μ); germ pores obscure; pedicel tadpole-like, persistent, hyaline, swollen immediately below the spore into a hyaline sub-globose portion, 30–43 μ broad and 40–60 μ long, below this it is immediately contracted to a diameter of 6·5–10 μ, and the lower portion which is up to 90 μ long, tapers gradually to the base.

Host: Asparagus laricinus Burch., Leeuwdoorns, Transvaal, 20.7.10, Burtt Davy [928]; Ventersdorp, Potchefstroom District, 10.10.11, Mitchell [1889]; Hennops River, Pretoria District, 27.4.12, Pole Evans [2271]; Bloemfontein, Orange Free State, 28.6.12, Pole Evans [2441]; Pretoria, 22.8.13, Doidge [6925].

Distribution: South Africa.

Characterised by the peculiar pedicel of teleutospores and the rather unusual uredospores.

Bulbinella Kunth.

102. **Puccinia contecta** Syd.

in Ann. Myc. 22, p. 236 (1924).

II. Uredo-sori amphigenous, without leaf-spots, scattered or in small groups, round or elliptical, long remaining covered by the epidermis, yellow, 0·3–0·6 mm. diam. Uredospores globose, sub-globose, or ellipsoid, 20–25 × 20–22 μ; epispore hyaline, minutely verruculose, scarcely 1 μ thick with 6–8 conspicuous, scattered germ pores.

III. Teleuto-sori similar to the uredo-sori, but grey-black and always covered by the lead-covered epidermis. Teleutospores irregularly ellipsoid, oblong to clavate, often angular, rounded or sub-truncate at the apex, slightly or moderately constricted at the septum, usually attenuate at the base, smooth, chestnut-brown, the lower loculus being usually longer than the upper, 42–60 × 19–28 μ; epispore about 2 μ thick, not thickened at the apex; germ pore in the upper cell apical or nearly so, and often with a hyaline papilla; pedicel short, hyaline or sub-hyaline, deciduous.

Host: Bulbinella robusta Kunth., Hopefield, August, 1923, van der Bijl (1244).

Not represented in the National Herbarium, the description is taken from the original.

Drimia Jacq.

103. **Puccinia Drimiae** van der Bijl.

in S.A. Jour. Sci., 1926 (Descriptions of some previously unnamed South African Fungi II).

II. Uredo-sori amphigenous, scattered, yellowish brown, about 0·5 mm. broad and up to 1·5 cm. long, at first covered by the blistered epidermis, then splitting longitudinally and surrounded by the torn epidermis, pulverulent. Uredospores globose or ellipsoid, 25–30 × 22–25 μ; epispore hyaline, 2·5–3 μ thick, delicately echinulate and with numerous small, scattered germ pores; contents yellowish brown.

III. Teleuto-sori amphigenous, black, scattered or becoming confluent, elliptic, usually up to 1 mm. long or becoming larger by confluence; long covered by the blistered epidermis, which finally ruptures longitudinally. Teleutospores chestnut-brown, clavate, oblong or irregular in shape, often somewhat angular, rarely 3-celled, rounded, or directly or obliquely truncate at the apex, attenuate or sub-rounded at the base, very slightly constricted at the septum, 33–55 × 23–33 μ; cells readily separating at the septum, upper cell often shorter and broader than lower; epispore smooth, 3–4 μ thick, not thickened at the apex; germ pores obscure; pedicel light brown, persistent, up to 30 μ long, tapering towards the base, not infrequently inserted obliquely or even transversely.

X. Mesospores not numerous.

Host: Drimia pusilla Jacq., Stellenbosch, Cape Province, 16.8.26, Duthie [21004].

I am indebted to Miss Duthie for sending material of this species at my request.

Eucomis L'Her.

104. **Puccinia amadelpha** Syd.

in Ann. Myc. 22, p. 420, 1924.

I. Aecidia amphigenous on yellow leaf-spots, which are round or oblong and 3–8 mm. long, usually few or in moderate numbers on each spot, irregular or circinate, often surrounding a central teleuto-sorus, cupulate, about 200 μ diam., yellow; peridium with a minutely denticulate margin; cells of the peridium firmly joined together, sub-rhomboid, 25–40 × 18–30 μ, with a thick striate outer wall, 6–8 μ thick, the inner wall verrucose, 4–7 μ thick. Aecidiospores angular-globose, 18–25 × 17–20 μ, epispore closely and minutely verruculose, hyaline, 1–1·5 μ thick.

II. Uredo-sori amphigenous, irregularly placed, often solitary, yellow-brown, long covered by the epidermis. Uredospores sub-globose, ellipsoid or ovate, 24–35 × 20–25 μ; epispore intensely yellow, 1·5–2 μ thick, sparsely echinulate, and with 6–8 scattered germ pores.

III. Teleuto-sori amphigenous, irregularly scattered, often solitary, minute, round or elliptical, about 0·3–0·5 mm. diam., long or indefinitely covered by the lead-coloured epidermis, pulverulent. Teleutospores rather irregular in form and size, often ovate, ovate-ellipsoid, or oblong, rounded at the apex, not constricted at the septum or slightly so, usually rounded at the base or somewhat attenuate, deep chestnut-brown, 36–54 × 21–33 μ, cells almost equal; germ pore in the upper cell apical and often papillate, septum often oblique, epispore 2–2·5 μ thick, smooth, not thickened at the apex, pedicel hyaline, equalling the spore, often inserted obliquely.

Host: Eucomis sp., Brenton, Knysna, July, 1923, Duthie, (van der Bijl 1174); Toise River, Cathcart District, 7.3.12, Pienaar [2218]; Harrismith, Orange Free State, January, 1919, Putterill [11869].

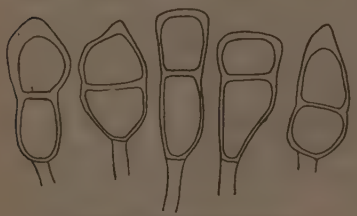
Distribution: South Africa.

Ornithogalum L.

105. **Puccinia Ornithogali thyrsoides** Diet.

in Hedwigia 44, p. 178, 1905.

II. Sori amphigenous on the leaves, caulicolous and on the flowering scapes. Uredo-sori oblong or round, deep cinnamon brown, surrounded by the raised epidermis. Uredospores ellipsoid or globose, 20–27 × 16–20 μ; epispore pale yellow, delicately echinulate, with 8–10 scattered germ pores.



Puccinia Ornithogali-thyrsoides. Teleutospores.

III. Teleuto-sori scattered or in groups, oblong or punctiform, sometimes becoming confluent, hard, black, covered by the epidermis. Teleutospores clavate or oblong, or irregular in shape on account of mutual pressure in the sorus, truncate, conoid or more rarely rounded at the apex, usually attenuate at the base, slightly constricted at the septum, brown, 30–60 × 16–27 μ; epispore smooth, about 2 μ thick, slightly thickened at the apex, sometimes up to 8 μ; pedicel persistent, brown, up to 20 μ long; paraphyses brown.

X. Mesospores fairly frequent, ellipsoid or irregular.

Hosts: Ornithogalum thyrsoides Jacq., Cape Province, November, 1913 [7079]; Capetown, 2.11.16, Pole Evans [9790]; Cango Valley, Oudtshoorn, 9.11.17, Doidge [10893]; found in Vancouver on plants sent from Capetown in cold storage, 13.2.25, Eastham [20357].

Distribution: South Africa.

Smilax L.

106. **Puccinia Kraussiana** Cke.

in Grevillea X, p. 126 (1882); Syd. Monogr. Ured. I, p. 636.

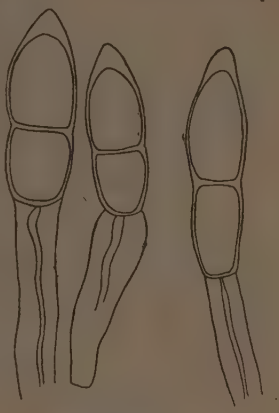
Syn. *Aecidium Kraussianum* P. Henn. in Engler. Ostafrikan. Pflanzenwelt, p. 53.
Caeoma Smilacis Barcl., On the life history of a new Caeoma on *Smilax aspera* in Scient. Mem. Medical Offic. of the Army of India IV, 1889, pp. 37–45.
Puccinia Prainiana Barcl. On two autoecious caeomata l. c. VI, 1891, p. 3.

I. Aecidia amphigenous, usually hypophyllous, on parts of the leaf which are hypertrophied, deeply sunk and without a true peridium, but surrounded by interlaced hyphae, opening by a central pore. Aecidiospores sub-globose, broadly pyriform or ovate, aculeate, yellow or yellow-brown, 26–40 × 22–30 μ, epispore up to 8 μ thick.

II. Uredo-sori hypophyllous, on round or indeterminate yellow or brown spots, often arranged in circles, minute, surrounded by the torn epidermis, pulverulent, yellow-brown. Uredospores oblong, strongly aculeate, yellow-brown, 35–55 × 22–30 μ, apex smooth and thickened up to 12 μ.

III. Teleuto-sori hypophyllous, on the same spots as the uredo-sori, scattered or circinate, or sometimes confluent to some extent, round, hemispherical, 1–1·5 mm. diam., compact, dull brown. Teleutospores oblong, ellipsoid or clavate, rounded or somewhat acute at the apex, attenuate or sub-rounded at the base, slightly constricted at the septum, pale yellow-brown, 54–80 × 20–25 μ; epispore smooth, about 2 μ thick, thickened at the apex up to 12 μ; germ pores obscure; pedicel pale yellow, very stout, up to 30 μ thick, but usually about 10 μ, and up to 170 μ long.

X. Mesospores fairly frequent, 60 × 16·5–20 μ.



Puccinia Kraussiana.
Teleutospores.

Host: Smilax Kraussiana Meisn., Inanda, Natal, June, 1881, Medley Wood 611 [10483 and 11155]; Stella Bush, Durban, 11.7.11, Doidge [1609]; Winkle Spruit, Natal, 5 6.12, Pole Evans [2397]; 6.7.12, Doidge [2502]; Isipingo, Natal, 11.5.13, Doidge [6631].

Distribution: Natal, East Africa, India.

Syd. (*loc. cit.*) expressed the opinion that P. Kraussiana and P. Prainiana were identical, but lacked the teleutospore material to confirm his views. The material in the National Herbarium shows only teleuto-sori; I have therefore taken the description of the aecidia and uredo-sori from Sydow's Monograph. The teleutospores are identical with those of Puccinia Prainiana (Syd. Uredineen 2176), and since the other spore forms are also identical, it would appear that P. Prainiana is a synonym of P. Kraussiana.

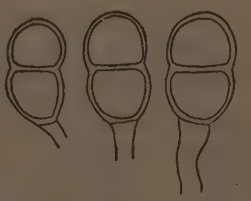
Urginea Steinh.

107. **Puccinia Kalchbrenneriana** De Toni.

in Sacc. Syll. Fung. VII, p. 661 (188); Syd. Monogr. Ured. I, p. 628.
Syn. *Puccinia Ornithogali* Kalch. in Grevillea IX, p. 21.
P. Urgines Kalchbr. et. Cke. in Herb.
Aecidium Ornithogali Kalch. in Herb.

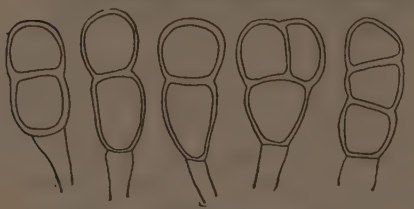
I. Aecidia in round groups, cupulate, rather flat, with a lacerate margin. Aecidiospores angular-globose, verruculose, pale yellow, 18–26 μ diam.

II. Uredo-sori amphigenous, usually hypophyllous, scattered or in small groups, 1–2 mm. long, long covered by the blistered epidermis, which finally splits longitudinally, partially exposing the mass of spores, elliptic or oblong, flat, rusty-brown. Uredospores globose, sub-globose or broadly ovate, pale yellow, 26–30 × 21–25 μ; epispore sub-hyaline, 2·5–3 μ thick, very delicately echinulate, and with numerous scattered germ pores.



Puccinia Kalchbrenneriana.
Teleutospores.
(MacOwan 1140.)

III. Teleuto-sori similar to the uredo-sori but darker, long covered by the lead-coloured epidermis. Teleutospores ellipsoid, oblong or clavate, rounded or truncate at the apex, constricted at the septum, rounded or attenuate at the base, brown, 35–54 × 20–27 μ; epispore smooth, 2–2·5 μ thick, not thickened at the apex; germ pores obscure; pedicel thick, persistent, hyaline, with a yellowish apex, up to 65 μ long and 10 μ thick, sometimes inserted obliquely; abnormal and 3-celled spores occur, sometimes the upper cell is divided longitudinally.



Puccinia Kalchbrenneriana.
[12180]
Teleutospores, two three-celled spores.

Hosts: Urginea altissima Bkr. (=Ornithogalum altissimum) on living eaves at the foot of the Boschberg Mountains, 1875, MacOwan 1140.

Urginea Uitenhagensis May, 1919, Alicedale, Cape Province, Cruden [12180].

Distribution: South Africa.

I have not seen the Aecidium.

Species parasitic on **Juncaceae.**

108. **Puccinia Junci** (Strauss) Wint.

in Hedwigia, 1880, p. 28, Syd. Monogr. Ured. I, p. 642.
Syn. *Uredo Junci* Strauss in Wett. Ann. II, p. 105 (1812).
Puccinia littoralis Rostr. in Thuem. Myc. Univ. n. 327 (1876).
var. **africana** var. nov.

II. Uredo-sori very minute, scattered, elliptical, rusty-brown; uredospores subglobose or ellipsoid, light brown, 16–24 × 13–19 μ; epispore about 1·5 μ thick, hyaline or pale yellow, rather sparsely aculeolate, and with 3 equatorial germ pores.

III. Teleuto-sori extremely minute, black, elliptical, scattered, long covered by the epidermis and later surrounded or partially veiled by the torn epidermis. Teleutospores clavate or ellipsoid, rounded or rarely sub-acute or truncate at the apex, attenuate or sub-rounded at the base, constricted at the septum, chestnut brown, much darker at the apex than the base, 30–50 × 16–20 μ; epispore smooth, about 1·5 μ thick, much thickened (up to 7 μ) at the apex; germ pore apical, obscure in lower cell; pedicel persistent, light brown, 5–6·5 μ thick and up to 40 μ long.

Puccinia Junci var *africana.*
Teleutospores and two mesospores.

X. Mesospores abundant, ellipsoid or clavate, 27–37 × 16–17 μ.

Hosts: Juncus oxycarpus E. Mey, on leaves and culms, Hennops River, Pretoria District, 28.11.12, Doidge [2039].

Juncus lomatophyllus Spreng. (II only), Kentani, Cape Province, 25.10.15, [9121].

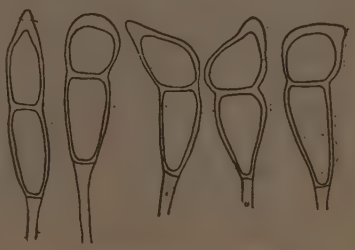
Differs from the type in the very much more minute sori and the teleutospores, which are shorter on the average and without any acuminate apices. Mesospores are abundant. The type occurs on Juncus botticinus, J. compressus and J. Gerardi, chiefly on the latter species, and is limited (*fide* Sydow, *loc. cit.*) to the coast region of the Baltic and North Sea.

Species parasitic on **Cyperaceae.**

Bulbostylis Kunth.

109. **Puccinia Bulbostylidis** n. sp.

II. Uredo-sori hypophyllous on brown leaf-spots, elliptic to linear, up to 2 mm. long, long covered by the blistered epidermis, scattered or when numerous developing in rows, finally rusty-brown, pulverulent. Uredospores ellipsoid or sub-globose, golden-brown, 16–20 × 21–28 μ; epispore golden-brown, 3–3·5 μ thick, often slightly thicker round the apex than at the base and sides, very delicately verruculose, and with 2–3 equatorial germ pores.



Puccinia Bulbostylidis.
Teleutospores.

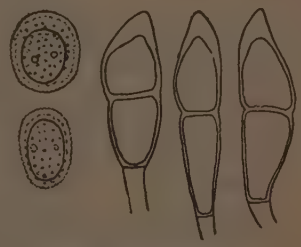
III. Teleuto-sori similar to the uredo-sori, but black and remaining indefinitely covered by the blistered epidermis. Teleutospores clavate or ellipsoid, light brown, becoming somewhat darker towards the apex, rounded, more or less acuminate or truncate and straight or oblique at the apex, slightly constricted at the septum, attenuate or rarely sub-rounded at the base, 33–60 × 13–19 μ; epispore smooth, about 1·5–2 μ thick, slightly thickened (up to 6·5 μ) at the apex; germ pores apical and just below the septum; pedicel persistent, light brown, about 5 μ thick and up to 45 μ long.

Host: Bulbostylis Burchellii C.B. Cl., on leaves, Commando Nek, Transvaal, 19.2.19, Pole Evans [12236].

Cyperus L. See also P. Cyperi-fastigiati Bothal 2:473

110. **Puccinia Cyperi-tagetiformis** (P. Henn.) Kern.
in Mycologia XI (1919), p. 138.
var. **africana** var. nov. = P. Pegleriana Bourge.

II. Uredo-sori hypophyllous and culmicolous, scattered, oblong, 0·5–2 mm. long, tardily dehiscent by longitudinal slits, bullate, finely pulverulent, cinnamon-brown. Uredospores ellipsoid or obovoid, more rarely sub-globose or clavate, 20–34 × 15–21 μ; epispore cinnamon brown, 3–3·5 μ thick, slightly thicker (3·5–5 μ) at the apex, verruculose, the markings being more conspicuous in upper part of spore. Germ pores 2, equatorial.



Puccinia Cyperi-tagetiformis.
Teleutospores and uredospores.

III. Teleuto-sori chiefly hypophyllous, most often confluent in groups 1–4 mm. long; individual sori linear, about 0·1 mm. in width, surrounded by a well-developed brownish stroma, blackish-brown, long covered by the epidermis. Teleutospores clavate, acuminate, obtuse or rounded at the apex, slightly constricted at the septum, attenuate at the base, 30–60 × 16–23 μ; epispore smooth, 1–1·5 μ thick, thickened at the apex (6–10 μ); germ pores apical and just below the septum; pedicel persistent, light brown, up to 30 μ long and 5 μ thick.

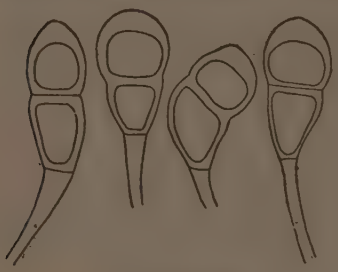
Host: Cyperus spp., Winkle Spruit, Natal, 29.1.12, Pole Evans [2033]; Umbelusi, Portuguese East Africa, 18.4.09, Howard [636]; Kentani, Cape Province, 11.2.14, Pegler [7403]; Kentani, 27.4.14, Pegler [7744].

Distribution: South Africa.

Differs from the type in the larger size of the teleutospores.

111. **Puccinia Pottsii, n. sp.**

II. Uredospores not numerous, a few being found amongst the teleutospores, light brown, broadly ellipsoid or sub-globose, 23–27 × 20–25 μ; epispore golden-brown, about 2 μ thick, moderately echinulate, and with 2 small germ pores near the apex.



Puccinia Pottsii.
Teleutospores.

III. Teleuto-sori hypophyllous, scattered or in groups, often very numerous and closely set; elliptic, up to 2 mm. long, long covered by the greyish, blistered epidermis, which finally ruptures by a longitudinal slit partially exposing the dark brown, pulverulent mass of spores. Teleutospores clavate, light brown at the base, deep chestnut brown near the apex, usually broadly rounded, less frequently somewhat acuminate at the apex, slightly constricted at the septum, attenuate at the base, 40–54 × 16–30 μ; epispore smooth, 2–2·5 μ, strongly thickened (up to 12 μ) at the apex; germ pores apical and just below the septum; pedicel persistent, light brown, about 5 μ thick and up to 40 μ long. Paraphyses none.

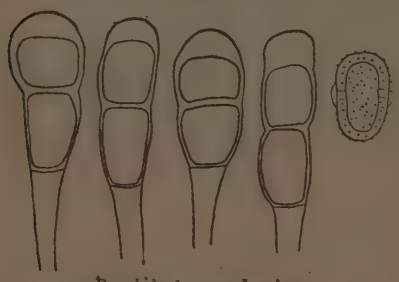
Host: Cyperus usitatus Burch, on leaves, Bloemfontein, Potts [11310].

Distribution: South Africa.

Differs from P. Cyperi in the character of the sori and the form of the teleutospores, which are comparatively shorter, and broader near the apex; they are also much darker in colour. It also differs in the absence of paraphyses.

112. **Puccinia transvaalensis** n. sp.

II. Uredo-sori hypophyllous, scattered or in rows, minute, elliptic, splitting longitudinally, light brown. Uredospores broadly ellipsoid or ovate, brown, 23–27 × 16–23 μ; epispore brown, minutely verruculose-echinulate, 3–3·5 μ thick, somewhat thickened at the apex and with two very conspicuous, papillate, equatorial germ pores.



Puccinia transvaalensis.
Teleutospores and one uredospore.

III. Teleuto-sori similar to the uredo-sori but darker, soon becoming naked. Teleutospores oblong, light brown, rounded at the apex, very gently constricted at the septum, base slightly attenuate to the thick pedicel, rarely sub-rounded, 50–70 × 16–20 μ; epispore smooth, 1–1·5 μ thick (septum sometimes 2 μ thick), strongly thickened at the apex (up to 11·5 μ) the upper loculus being truncated; pedicel up to 40 μ long, light brown, persistent, 10 μ thick; germ pores apical and just below the septum.

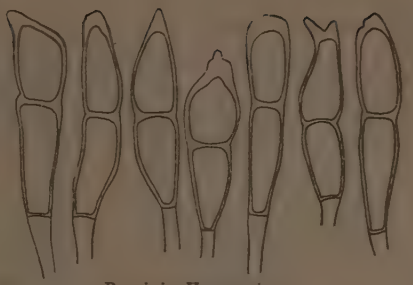
Host: Cyperus sp., Belfast, Transvaal, February, 1909, Doidge [570].

Mariscus Gaertn.

113. **Puccinia hennopsiana** n. sp.

II. Uredo-sori hypophyllous and culmicolous, scattered or becoming confluent in long lines, linear-elliptic, up to 2 mm. long, ochraceous, long covered by the blistered epidermis, later splitting longitudinally but remaining partially veiled. Uredospores ellipsoid, ovate or sub-globose, yellow-brown, 23–30 × 16–23 μ; epispore delicate hyaline, less than 1 μ thick, delicately verruculose-echinulate, and with 3–4 equatorial germ pores.

III. Teleuto-sori mostly hypophyllous, scattered, very minute, smaller than the uredo-sori, and remaining covered by the epidermis. Teleutospores clavate or oblong, very pale brown, occasionally three-celled, at the apex, directly or obliquely acuminate, rounded or more or less toothed, attenuate at the base, slightly constricted at the septum, 40–80 × 15–20 μ; epispore smooth, about 1 μ thick, strongly thickened at the apex (up to 10 μ); germ pores apical and just below the septum; pedicel persistent, brown, up to 40 μ long. Teleuto-sori divided into chambers by groups of brown paraphyses.



Puccinia Hennopsiana.
Teleutospores.

Hosts: Mariscus congestus C.B. Cl., on leaves and culms, Hennops River, Pretoria District, 28.1.12, Doidge [2038].

Mariscus sp., Kyagu, Uganda, October, 1915, Dummer 1120 and 1152 [11955].

Distribution: South and Central Africa.

I am indebted to Miss Wakefield for pointing out the probable identity of the South African rust with that collected by Dummer in Uganda, and for material from Dummer's collection showing teleutospores.

Species parasitic on **Gramineae.**

Agrostis L.

cfr. Triticum L.

Aristida Nees.

114. **Puccinia aristidicola** P. Henn.

in Hedwigia, 1896, p. 243; Syd. Monogr. Ured. I, p. 728.

II. Uredospores mixed with the teleutospores, globose, sub-globose or ellipsoid, golden-brown, 3–4 μ thick, very finely and closely verruculose and with 4 equatorial germ pores.

III. Teleuto-sori epiphyllous or on the culms, oblong or striiform, long covered by the epidermis, which finally splits longitudinally, black, often in closely crowded groups covering large areas of the leaf surface, and surrounded by the torn epidermis. Teleutospores irregular in shape, ellipsoid, oblong, ovate or sub-globose, brown, darker near the apex, rounded at the apex, very slightly constricted at the septum, rounded or attenuate at the base, 27–46 × 20–28 μ; epispore smooth, usually 2–3 μ thick in the lower cell, very slightly thickened at the apex or moderately so (up to 6·5 μ); germ pore apical, obscure in lower cell; pedicel persistent, thick, brown at the apex, and up to 110 μ long.

Puccinia aristidicola.
Teleutospores.

Hosts: Aristida angustata Stapf., Vryburg, 24.7.17, Butler [10139].

Aristida congesta R. and S., Bloemfontein, 22.3.17, Potts [11313].

Distribution: South Africa, Argentine, Mexico.

Both the hosts are South African grasses. A. congesta, Stik-gras, is a troublesome weed.

115. **Puccinia Eylesii** n. sp.

II. Uredospores mixed with the teleutospores, in the same sori, sub-globose or ellipsoid, golden-brown, 20–24 × 16–20 μ; epispore light brown, 1·5–2 μ thick, finely echinulate, and with numerous scattered germ pores.

Puccinia Eylesii.
Teleutospores.

III. Teleuto-sori scattered, amphigenous and on the inflorescence, round to elliptic, soon becoming exposed, pulvinate, minute or up to 1 mm. long. Teleutospores globose or sub-globose, broadly rounded at base and apex, not constricted at the septum, chestnut-brown, often darker at the apex, 23–34 × 21–34 μ; epispore very thick, 5–6·5 μ thick at the base, and 10–12 μ thick at the apex; germ pores apical and basal; pedicel persistent, long and rather thick, hyaline or light brown, about 5 μ thick and up to 150 μ long, often flexuous and occasionally inserted obliquely or transversely.

Hosts: Aristida spp., on leaves and inflorescences, Salisbury, Rhodesia, May, 1920, Eyles 2239 [15516]; Springbok Flats, 3.7.25, Melle [20433].

Distribution: Transvaal and Rhodesia.

Differs from P. aristidicola in the character of the sori, the smaller, thinner walled uredospores with numerous scattered germ pores, and the more globose teleutospores.

Arundinella Raddi.

116. **Puccinia Arundinellae** Barcl.

Descript. List. Ured. Simla II, p. 245 (1889); Syd. Monogr. Ured. I, p. 732.

Syn. *Dicaeoma Arundinellae* Arth. et Fromme, N. Am. Flora 7, p. 285, 1920.

II. Uredo-sori hypophyllous, scattered, oblong or ellipsoid, minute, up to 1 mm. long, pale, partially covered by the epidermis. Uredospores yellow, ellipsoid to ovate 22–30 × 16–20 μ; epispore hyaline, about 2 μ thick, minutely verruculose-echinulate and with numerous scattered germ pores.

Puccinia Arundinellae.
Teleutospores.

III. Teleuto-sori hypophyllous, scattered, oblong up to 1 mm. long, compact, black. Teleutospores brown, ellipsoid to oblong, rounded at both ends, not constricted at the septum or slightly so, 33–45 × 22–30 μ; epispore smooth, about 2·5 μ thick, thickened at the apex (6–10 μ); germ pores apical and just below the septum; pedicel hyaline, persistent up to 130 μ long, sometimes inserted obliquely.

Host: Arundinella Ecklonii Nees. II and III, Skinner's Court, Pretoria, 27.2.05, Sampson [116]; II, Skinner's Court, 21.4.06, 30.12.10, February, 1911, January, 1911, Pole Evans [127, 1059, 1180, 1190].

Distribution: South Africa, India.

The host is a common South African vlei grass, nearly related to A. brasiliensis which occurs throughout tropical Asia and America.

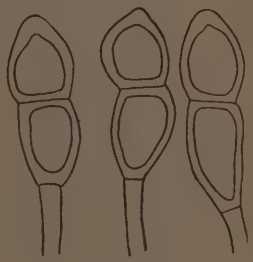
Arundo L.

117. **Puccinia torosa** Thuem.

in Mycoth. univ. m. 1725; Syd. Monogr. Ured. I, p. 793.

II. Uredospores not numerous, a few being found mixed with the teleutospores, ellipsoid, yellow, 27–37 × 16–23 μ; epispore pale yellow, 3–3·5 μ thick, verruculose and with 4 equatorial germ pores.

III. Teleuto-sori very large, very dark brown, often up to 1 cm. long, frequently becoming confluent and forming compound sori up to 3 cm. long and 1·5 cm. broad, thick, compact, hard, erumpent Teleutospores cylindrical-clavate, apex rounded or rather acute, rather strongly constricted and readily falling apart at the septum, attenuate at the base, brown, 40–70 × 18–24 μ; epispore smooth, about 3 μ thick, thickened at the apex (up to 10 μ); germ pore apical, obscure in the lower cell; pedicel yellow-brown, persistent, flexuous, up to 250 μ long.



f. *Puccinia torosa.* Teleutospores.

Host: Arundo Donax L., on dry leaves and sheaths, Aliwal North, January, 1912, Pienaar [2354].

Distribution: South Africa.

Originally collected by MacOwan near Somerset East, The host occurs from the Mediterranean region to the Himalayas and is naturalized in South Africa.

Avena L.

cfr. also Triticum, L.

118. **Puccinia coronata** Corda.

Icon. Fung. I, p. 6, Syd. Monogr. Ured. I, p. 699.
Syn. *Aecidium crassum* Pers. Syn. Fung., p. 208, pp.
Ae. Frangulae Schum. Pl. Sall. ii, p. 225.
Puccinia sertata Preuss. in Sturm. Fl. III, p. 25.
P. Lolii Niels. in Ugeskrift for Landmaend, 1875, Bd. I, p. 551.
P. coronata var. *Lolii* Bleek. in West. Bull. de l'Acad. de Belge, 1853, II, p. 235.
P. Rhamni Wettst. in Verhandl. Zool.-botan.; Gesellsch. Wien, 1885, p. 545; Arth. et Holw. Bull. Lab. Nat. Hist. State Univ. of Iowa, 1898, p. 398.
P. Catharticae Lagh. in Ured. Herb. El. Fries, p. 52.
P. Calamagrostidis Syd. in Ured. Exs. No. 662.
Dicaeoma Rhamni Kuntze. Rev. Gen. 3, p. 470, 1898.

[O. Spermogones amphigenous, associated with the aecidia, reddish-brown.

I. Aecidia hypophyllous or on the petioles, on yellow or purplish spots, scattered or arranged in groups, producing distortion of the affected parts, cylindrical, with a white, torn, revolute margin. Spores globose or broadly elliptical, 16–24 × 14–20 μ; epispore hyaline, closely and finely verruculose, 1–1·5 μ thick].

II. Uredo-sori amphigenous, and on sheaths, at first scattered, elliptical, becoming aggregated and often confluent, and linear, up to 2–3 mm. long. bullate, yellow-brown, becoming pulverulent. Uredospores globose to obovate, 18–27 × 16–24 μ; epispore pale yellow, 1–1·5 μ thick, finely and rather sparsely echinulate, and with 3–4 scattered germ pores on one face. A few yellowish, club-shaped paraphyses are sometimes present.

Puccinia coronata.
Teleutospores.

III. Teleuto-sori hypophyllous, sometimes arranged in circles round the uredo-sori, scattered, or occasionally confluent, oblong or linear 0·5–1 mm. long, nearly always remaining covered by the epidermis, black, compact. Teleutospores cuneate, apex truncate, darker in colour and crowned with 5–8 obtuse digitaliform processes, which are variable in shape and size, frequently reaching a length of 10 μ, hardly or not at all constricted at the septum, attenuate at the base, basal cell longer, narrower and much lighter in colour than the upper, 35–60 × 12–22 μ; epispore smooth, 1–1·5 μ thick, thickened at the apex (up to 7 μ), germ pore of upper cell apical, obscure, basal pore midway between septum and pedicel, obscure; pedicel persistent, short, thick, light brown, continuous with the spore and up to 20 × 9 μ.

Hosts: Avena sativa L., Skinner's Court, Pretoria District, 21.5.06 [23]; Standerton, February, 1906, Wyndham [73, 76, and 104]; Cedara, Natal, 14.5.06 [118]; Skinner's Court, 12.11.06, Pole Evans [206]; Lemana, Elim, Zoutpansberg District, 20.8.08, Pole Evans [499]; Potchefstroom, November, 1910, Burtt Davy [1044]; Salisbury, Rhodesia, 28.5.11 [1649]; Cedara, Natal, 13.11.11, Fisher [1918].

Lolium perenne L., Potchefstroom, 6.2.07 [240].

Lolium italicum Mooi River, Natal, 15.4.11, Burtt Davy [1474].

Distribution: World-wide

The "Crown rust" was divided by Klebahn into two species, P. coronata and P. Lolii, and it is customary to keep them separate.

The name Puccinia coronata is given to a crown rust on the grasses Calamagrostis, Agropyron, Agrostis, Dactylis, Festuca, Holcus, and Phalaris of which the aecidial stage occurs on Rhamnus frangula. The second crown rust, Puccinia Lolii on Avena, Lolium, Alepocurus, Arrhenatherum, Festuca, Glyceria and Holcus, has its aecidium on Rhamnus catharticus. P. coronata was further divided by Eriksson into eight biological species, and P. Lolii, into three such forms. Other investigators, e.g. Carleton and Grove, consider that the host distinctions are insufficient to separate the two forms and that P. coronata and P. Lolii are biological forms of one species.

Two species of Rhamnus occur in South Africa, Rh. prinoides and Rh. Zeyheri of which the latter is closely related to Rh. frangula, but no aecidial form is known on either of these. I have, therefore, included the South African collections under the original name Puccinia coronata Cda, as has been done by Arthur and Fromme (North American Flora, Vol. 7, pt. 4, p. 313, 1920).

Chloris Sw.

119. **Puccinia Chloridis** Speg.

Fg. Guaranit. nonnulli novi v. crit., p. 17 (1891); Syd. Monogr. Ured. I, p. 742.

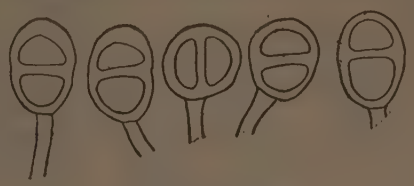
Syn. *Puccinia Chloridis* Diet. in Hedw., 1892, p. 290.

P. Dietelii Sacc. et Syd. in Syll. Fung. XIV, p. 358.

Dicaeoma Chloridis Kuntze Rev. Gen. 3, p. 468, 1898.

II. Uredo-sori amphigenous or caulicolous, usually hypophyllous, oblong or by confluence oblong-linear, soon becoming naked, surrounded by the torn epidermis, yellow-brown. Uredospores sub-globose, ovate or ellipsoid, yellow, 18–26 × 14–22 μ; epispore hyaline, about 2·5 μ thick, often slightly thickened round the apex (up to 5 μ); germ pores small and obscure.

III. Teleuto-sori amphigenous or caulicolous, usually hypophyllous, oblong or becoming linear by confluence and up to 3 mm. long, soon becoming naked, surrounded by the torn epidermis, rather compact, black. Teleutospores chestnut-brown, subglobose, broadly ellipsoid or oblong, rounded at the apex, not constricted at the septum, or very slightly so, rounded at the base, or rarely somewhat attenuate, 23–30 × 20–30 μ; epispore smooth, 2–2·5 μ thick, usually slightly thickened (up to 6 μ) at the apex; germ pores obscure; pedicel brown at the apex, persistent, up to 100 μ long, often inserted obliquely.



Puccinia Chloridis.
Teleutospores.

Hosts: Chloris gayana Kunth., Bulawayo, Rhodesia, August, 1911, [1841]; Groenkloof, Pretoria, 23.5.18, Pole Evans [11663].

Chloris pycnothrix Trin., Winkle Spruit, Natal, 5.6.12, Pole Evans [2389].

Chloris virgata Swartz, Winkle Spruit, 5.6.12, Pole Evans [2400].

Distribution: South Africa, North and South America.

Sydow (*loc. cit.*) gives the dimensions of the teleutospores as 26–40 × 17–24 μ; none of the spores in our specimens appear to be more than 30 μ long, but I think there can be no doubt that the South African rust belongs to this species.

The hosts are all indigenous. Chloris gayana is known as Rhodes grass, and is an excellent grass for permanent pastures; it is a native of tropical and sub-tropical Africa and is cultivated in America and Australia as well as in South Africa. Ch. virgata is a useful hay and pasture grass, known as "old lands" grass, and is widely distributed through the tropics of both hemispheres. Ch. pycnothrix is a common wayside weed.

Cymbopogon Spreng.

cf. Hyparrhenia.

Cynodon Pers.

120. **Puccinia Cynodontis** Desm.

Exs. III, No. 655, Syd. Monogr. Ured. I, p. 748.

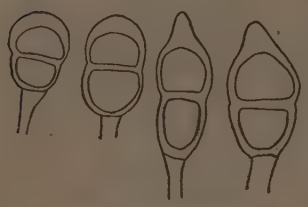
Syn. *Aecidium Plantaginis* Ces. Erb. Critt. Ital. 247, 1859.

Dicaeoma Cynodontis Kuntze, Rev. Gen. III, 418, 1898.

[O. Spermogones epiphyllous, in small groups on discoloured spots, honey-yellow, becoming blackish, flattened-globose, 110–160 μ diam., 60–90 μ deep, ostiolar filaments short.

I. Aecidia amphigenous, in circular groups 1–3 mm. in diam., on discoloured spots, briefly cupulate, minute, 0·2–0·3 mm. diam.; margin of the peridium hyaline or yellowish, lacerate and slightly recurved; cells of the peridium quadratic, 15–21 × 26–34 μ, outer wall striate, 7–9 μ thick, inner wall coarsely verrucose, 3–5 μ thick. Aecidiospores globose or ellipsoid, 19–24 × 23–29 μ, wall hyaline, 1·5–2 μ thick, closely and conspicuously verrucose.]

II. Uredo-sori amphigenous, minute, scattered or in series, elliptic or oblong, soon naked, yellow-brown. Uredospores sub-globose or broadly ellipsoid, light brown, 19–28 μ diam.; epispore light brown, 2·5–3 μ thick, very delicately echinulate, sometimes almost smooth, and with 3 equatorial germ pores.



Puccinia Cynodontis.
Teleutospores.

III. Teleuto-sori amphigenous or on the culms, usually hypophyllous, scattered or seriate, often confluent, elliptic, oblong or linear, black. Teleutospores ellipsoid or oblong, rounded or conoid-acuminate at the apex, constricted at the septum, rounded or somewhat attenuate at the base, brown, 30–60 × 15–25 μ; epispore smooth, 1·5–2 μ thick, strongly thickened at the apex (up to 13 μ); germ pore apical in upper cell, obscure in lower; pedicel thick, persistent, brown, up to 70 μ long.

Host: Cynodon dactylon Pers., Skinner's Court, Pretoria, 21.4.06, Pole Evans [22].

Distribution: South Africa, Europe, Asia, North Africa, Australia, East India, North America, Porto Rico.

P. Cynodontis is represented in the National Herbarium by only a single collection, although the host is exceedingly common. In this collection there are only a few teleutospores, and they have rounded apices. The uredospores as described above have thick walls and 3 germ pores. According to Magnus (Verhandl. Zool. botan. Gesellsch. Wien., 1899, p. 95), this species forms two kinds of uredospores, one with thin walls and numerous (up to 9 germ pores), the other thick walled with few (1–3) germ pores. The aecidium on Plantago sp., is only known in Europe and Japan. The host is a cosmopolitan weed.

Dactylis L.

cf. Triticum.

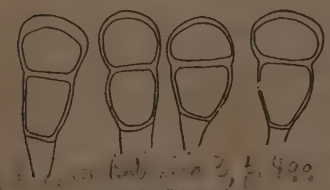
Digitaria Rich.

121. **Puccinia Digitariae** Pole Evans. = *Puc. odontodes*

in Ann. Bolus Herb. II (1917), p. 111.

Syn. *Uredo digitariaecola* Thuem. in Myc. Univ. No. 2041 (1882); Syd. Monogr. Ured. IV, p. 604.

II. Uredo-sori on light brown leaf-spots, mostly hypophyllous, scattered or in short series, minute, elliptic, ochraceous, soon naked and pulverulent. Uredospores light brown, sub-globose, ellipsoid or ovate, 23–33 × 19–24 μ; epispore light brown, about 1–1·5 μ thick, briefly and rather sparsely echinulate and with 4 equatorial germ pores. Paraphyses rather numerous, very variable, bent or curved, yellowish or almost hyaline, 35–60 μ long, capitate or clavate above and 10–15 μ diam.



Puccinia Digitariae.
Teleutospores.

III. Teleuto-sori on the same spots as the uredo-sori, hypophyllous, scattered, minute, black, punctiform, remaining indefinitely covered by the epidermis. Teleutospores chestnut-brown, darker at the apex, clavate, cuneate or oblong, the upper cell being usually shorter and broader than the lower, rounded or truncate at the apex, rarely sub-acute, more or less attenuate, rarely sub-rounded at the base, usually slightly constricted at the

septum, 27–47 × 20–30 μ; epispore smooth, about 1 μ thick, thickened at the apex (up to 6 μ); germ pores obscure; pedicel persistent, brown, short and rather thick, up to 15 μ long, 10 μ thick at the apex, and tapering towards the base.

Hosts: Digitaria debilis Willd., on leaves, Kentani, 5.6.12, Pegler 1879 [2372, 8881].

Digitaria eriantha Steud., Cedara, Natal, 24.4.23, Staples [17082]; Wharncliffe, East London, 5.3.12, Pienaar [2175].

Digitaria Smutsii Stent, Groenkloof, Pretoria, April, 1925, Pentz 20470].

Digitaria sp., Skinner's Court, Pretoria District, January, 1911, Pole Evans [1192].

Distribution: South Africa.

The hosts are all indigenous. Digitaria eriantha is an excellent hay and pasture grass, widely distributed throughout South Africa and extending into the tropics. D. debilis is an annual grass of little value occurring in the coastal districts of Natal and the Mediterranean. D. Smutsii is a good pasture grass only recorded from the Transvaal.

Festuca L.

cfr. Triticum.

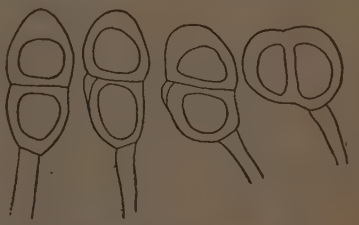
Hemarthria Munro.

122. **Puccinia Rottboelliae** Syd.

in Monogr. Ured. I, p. 800.

II. Uredo-sori amphigenous, scattered, on small brown leaf-spots, very minute, ochraceous. Uredospores sub-globose, ellipsoid or pyriform, brown, 25–30 × 20–26 μ; epispore brown, about 1 μ thick, briefly echinulate, and with 2–3 equatorial germ pores.

III. Teleuto-sori on leaves and sheaths, amphigenous, mostly hypophyllous, scattered or more or less grouped, oblong or linear, 0·5–3 mm. long, surrounded by the torn epidermis, black, subpulvinate. Teleutospores ellipsoid or oblong, sometimes obliquely flattened, rounded at the apex, more or less constricted at the septum, rounded at the base, chestnut-brown, 34–54 × 20–27 μ; epispore smooth, about 3 μ thick, thickened at the apex (up to 10 μ); germ pores apical and just below the septum; pedicel persistent, hyaline, rather thick, up to 120 μ long, often inserted obliquely or transversely.



Puccinia Rottboelliae. Teleutospores.

Host: Hemarthria fasciculata Kunth (=Rottboellia compressa var. fasciculata), Bulawayo, April, 1912, Rogers 5868 [2239]; Hennops River, Pretoria District, 28.1.12, Doidge [2034].

Distribution: South Africa, Abyssinia.

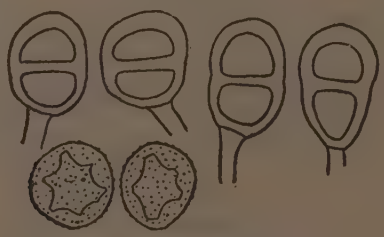
The host occurs throughout Africa and the Mediterranean region; it is also found in America, where it has possibly been introduced.

Heteropogon Pers.

123. **Puccinia versicolor** Diet. et. Holw.

in Botan. Gazette, 1897, p. 28; Syd. Monogr. Ured. I, p. 724.

II. Uredo-sori hypophyllous, on irregular yellowish or red-brown leaf-spots, which are conspicuous on the upper side of the leaf, scattered, oblong or linear, surrounded by the ruptured epidermis, yellow. Uredospores globose, sub-globose or ovate, sub-hyaline, 26–36 × 23–32 μ; epispore hyaline, briefly echinulate, irregularly thickened (up to 8·5 μ), in such a manner that the cavity has radiating projections and is stellate in effect; germ pores obscure.



Puccinia versicolor.
Teleutospores and uredospores.

III. Teleuto-sori hypophyllous, on the same spots, oblong or linear, 1–4 mm. long, surrounded by the torn epidermis, compact, black. Teleutospores ellipsoid or oblong, brown, rounded at the apex, not constricted at the septum or very slightly so, usually rounded at the base, 34–48 × 22–32 μ; epispore smooth, about 2·5 μ thick, often slightly thickened round the apex (up to 8 μ); germ pore in the upper cell apical or nearly so, obscure in the lower; pedicel hyaline, persistent, rather thick, and up to 130 μ long.

Hosts: Heteropogon contortus R. and S., Skinners Court, Pretoria, 30.12.10, Pole Evans [1047]; Garstfontein, Pretoria District, 26.3.11, Pienaar [1264].

Hyparrhenia sp., Garstfontein, Pretoria District, 3.3.15, Pienaar [8913].

Monocymbium ceresiaeforme Stapf., Garstfontein, Pretoria District, 26.3.11, Pienaar [1270].

Themeda triandra Forsk., Johannesburg, Feb., 1908 [461]; Koodoo's Poort, Pretoria District, 13.7.11, Pearson [1586]; Springbok Flats, 25.10.07, Burtt Davy [767]; Groenkloof, Pretoria, 16.2.15, Pole Evans [8938].

Grass undetermined (Andropogoneae), Pretoria, 13.4.15, Howlett [9051]; Mooi River, Natal, 21.3.17, Mogg [10068].

Distribution: South Africa, Mexico, Argentine.

This species is characterised by the peculiar thickening of the hyaline wall of the uredospore.

The hosts all belong to the tribe Andropogoneae. Heteropogon contortus, Spear grass, is widely distributed through the tropics and sub-tropics; it is a troublesome grass when in flower on account of the sharp-pointed callus. Themeda triandra, the rooi grass of South Africa and the Kangaroo grass of Australia, ranges throughout the tropics of the old world. Monocymbium ceresiaeforme is a hay and pasture grass of little value occurring in tropical and sub-tropical Africa.

Hordeum L.

cfr. Triticum L.

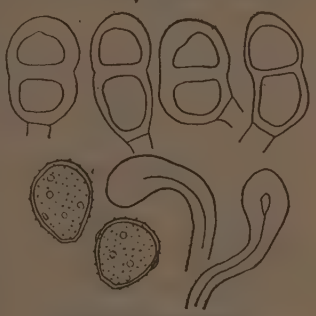
Hyparrhenia Anders.

cfr. also Heteropogon.

124. **Puccinia erythraeënsis** Pazschke.

in Engl. Bot. Jahrb. XVIII, 1893, p. 14; Syd. Monogr. Ured. I, p. 724.

II. Uredo-sori hypophyllous, on elongated yellow-brown leaf-spots, oblong or linear, up to 2 mm. long, long covered by the epidermis, cinnamon-brown. Uredospores ovate or sub-globose, less frequently ellipsoid, brown, 23–30 × 16–23 μ; epispore brown, briefly echinulate, about 1·5 μ thick and with 5–8 rather conspicuous, scattered germ pores. Paraphyses very numerous, hyaline or flavescent, clavate or capitate, straight or curved, up to 80 μ long and 23 μ broad at the apex.



Puccinia erythraeënsis. Teleutospores, uredospores, and paraphyses.

III. Teleuto-sori similar to the uredo-sori, but darker. Teleutospores ellipsoid or oblong-ellipsoid, rarely clavate or sub-globose, rounded at the apex, not constricted at the septum or slightly so, rounded, or rarely sub-attenuate at the base, chestnut-brown, 30–40 × 20–27 μ; epispore smooth, 2·5–3 μ thick, slightly thickened at the apex (up to 6 μ); germ pore apical, obscure in the lower cell; pedicel stout, persistent, hyaline, up to 100 μ long and 8·5 μ thick, sometimes inserted obliquely.

Hosts: Cymbopogon excavatus Stapf., Groenkloof, Pretoria, 25.1.15, Turner [8914]; Pretoria, 30.3.21, Pole Evans [14650].

Cymbopogon plurinodis Stapf, Irene, Pretoria District, January, 1908, Pole Evans [452].

Hyparrhenia auctus Stent, Garstfontein, Pretoria District, 30.3.12, Pole Evans [2220].

Hyparrhenia Buchanani Stapf., Garstfontein, Pretoria District, 30.3.12, Pienaar [2219].

Hyparrhenia cymbaria Stapf., Winters Kloof, Natal, 30.6.12, Doidge [2517]; Cramond, Natal, 3.6.12, Pole Evans [2411]; Town Bush Valley, 7.4.11, Pole Evans [1447].

Hyparrhenia hirta Stapf., Arcadia, Pretoria, 14.5.13, Pole Evans [6682].

Hyparrhenia spp., Pretoria, 30.1.11, Pole Evans [1084]; Tweedie, Natal, Mogg [11642]; Cramond, Natal, 3.6.12, Pole Evans [2402]; Muckleneuk, Pretoria, 18.5.12, Doidge [2308]; Groenkloof, Pretoria, April, 1925, Pentz [20471].

Distribution: South Africa, Abyssinia.

Distinguished from Puccinia versicolor chiefly by the numerous paraphyses, and the usually ovate uredospores, with comparatively thin brown wall and conspicuous germ pores.

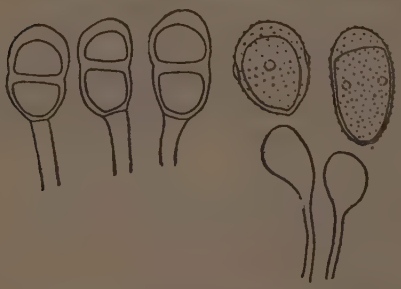
The hosts all belong to the tribe Andropgoneae and are indigenous to South and tropical Africa.

Imperata Cyr. cf. also P. Imperatae Doidge Bothal 2:474

125. **Puccinia rufipes** Diet.

in Engl. Bot. Jahrb. XXXII, p. 48, 1902; Syd. Monogr. Ured. I, p. 757.

II. Uredo-sori hypophyllous, more rarely epiphyllous, scattered, minute, oblong, 0·5–1·5 mm. long, ochraceous. Uredospores chestnut-brown, sub-globose, or often ovate, ellipsoid or pyriform, 22–35 × 18–25 μ; epispore brown, 2–3 μ thick and often thickened round the apex (up to 7 μ), echinulate, and with four equatorial germ pores. Spores mixed with pale capitate paraphyses.



Puccinia rufipes.
Teleutospores, uredospores, and paraphyses.

III. Teleuto-sori amphigenous, scattered, oblong or sub-linear, 0·5–2 mm. long, black. Teleutospores ellipsoid, rounded at both ends, usually slightly constricted at the septum, chestnut-brown, 28–34 × 18–24 μ; epispore smooth, about 2 μ thick, not thickened at the apex or slightly so (up to 5 μ); germ pores obscure; pedicel persistent, reddish-brown, rather thick, up to 90 μ long; insertion sometimes lateral or oblique.

Host: Imperata arundinacea Cyr., Winkle Spruit, Natal, 5.6.12, Pole Evans [2401] and 6.7.12, Doidge [2516].

Distribution: South Africa, Japan, East India.

The host occurs in moist situations throughout tropical and South Africa.

Lolium L.

cfr. Avena, Triticum.

Monocymbium Stapf.

cfr. Heteropogon.

Oplismenus L.

126. **Puccinia advena** Syd.

in Ann. Myc. 22, p. 419, 1924.

II. Uredo-sori epiphyllous, without leaf-spots, or on pale indeterminate spots, scattered irregularly or a few may be arranged in a row, round or elliptical, about 0·3–0·5 mm. diam., long covered by the yellowish epidermis. Uredospores ovate-ellipsoid, oblong or fusoid, more or less attenuated towards each end, but obtuse at the apex and often truncate at the base, smooth or almost smooth, yellow-brown, 35–44 × 17–21 μ; epispore 1–1·5 μ thick at the sides, at the apex often the same or slightly thicker, but sometimes very much thicker (2–7 μ); usually also slightly thicker laterally at the base; with two germ pores at the base.

III. Teleuto-sori hypophyllous, scattered or often more or less distinctly arranged in lines, elliptic or oblong, 0·3–1·5 mm. long, often confluent, surrounded or partially veiled by the torn epidermis, sub-pulverulent, rather waxy, somewhat pulvinate, black. Teleutospores regular, ellipsoid or ovate-ellipsoid, always rounded at both ends, always moderately constricted at the septum, chestnut-brown or pale chestnut-brown, 35–40 × 22–26 μ; epispore about 2 μ thick at the sides not thickened at the apex smooth; cells equal; germ

pore in the upper cell apical, in the lower near the septum or a little below it; pedicel vertical or oblique, very rarely transverse, hyaline, rather thick and long but often deciduous.

Host: Oplismenus africanus Beauv., on leaves, Woodbush, Transvaal, July, 1924, Van der Bijl, 1537.

Distribution: South Africa.

The host is a shade grass occuring in South Africa, Tropical Africa, America, and the Sandwich Islands.

Phragmites Trin.

127. **Puccinia Magnusiana** Korn.

in Hedwigia, 1876, p. 179; Syd. Monogr. Ured. I, p. 785.

Syn. *Puccinia graminis* Pers. var. *Arundinis* Cke. Handl., p. 493.
P. arundinacea, B. epicaula, Wallr. Fl. crypt. Germ. II, p. 225.
P. Phragmitis Tvl. Ann. Sc. nat. IV, p. 184.
P. striola Pass. in Rabh. Fg. eur. 464.
Lecythea Phragmitidis Oud. Nederl. Kruidk. Archief XXV, p. 260.
L. Baryi Oud. in Rabh. Fg. Eur. No. 1488.
Aecidium Ranunculacearum D.C.Fl. franc. VI, p. 97, p.p.
Dicaeoma Magnusiana Kuntze. Rev. Gen. 3, p. 469, 1898.

[I. Aecidia hypophyllous, in small clusters on yellowish spots, or forming elongated groups on the petioles or stems, cupulate with a white, lacerate margin; aecidiospores globose, yellowish, 15–25 μ diam., densely and finely verruculose.]

II. Uredo-sori amphigenous, scattered, rarely confluent, elliptical or oblong, 1–2 mm. long, pulverulent, pale yellowish brown. Uredospores mostly ovate or ellipsoid, pale yellowish-brown, 20–35 × 12–20 μ; epispore pale yellowish-brown, about 2·5 μ thick, delicately echinulate; germ pores numerous, scattered and usually rather indistinct. Paraphyses numerous, clavate, hyaline or light brown.

III. Teleuto-sori amphigenous, very numerous, usually scattered over the whole leaf surface, oblong or sub-linear, minute, 1–2 mm. long, or on the culms and leaf sheaths forming narrow striae several centimetres long, flat, compact, persistent, blackish. Teleutospores oblong or clavate, rounded at the apex, or more rarely conically attenuate or truncate, hardly constricted at the septum, attenuate at the base, chestnut-brown, 32–55 × 16–26 μ; epispore smooth, 2–2·5 μ thick, thickened at the apex (up to 12 μ); germ pore apical, obscure in lower cell; pedicel firm, persistent, yellowish, about as long as the spore or longer, up to 70 μ long.

X. Mesospores not numerous, chestnut-brown, variable in shape, thickened at the apex.

Puccinia Magnusiana.
Teleutospores, uredospores, and paraphyses.

Hosts: Phragmites communis Trin., on leaves and sheaths, Natal, Medley Wood 444 [10022 and 10466]; Fort Beaufort, March, 1907 [292]; Koster River, Transvaal, 26.5.08 [468]; Garstfontein, Pretoria District, 25.3.11, Pienaar [1254]; Kritzinger's Dam, near Dordrecht, 4.1.12, Pienaar [2005]; Tweespruit, Ladybrand District, 25.4.15, Van der Merwe [8961]; Bloemfontein, 6.4.17, Potts [11304]; Klip River, Natal, 12.5.20, Doidge [14165]; Lakeside Vlei, near Capetown, 17.2.31, Thomson [14652].

Distribution: South Africa, Europe, Japan, Australia.

It was shown by Plowright and confirmed by Klebahn and Fischer that the aecidium of Puccinia Magnusiana occurs only on Ranunculus bulbosus and R. repens; it is not probable, therefore, that the aecidium occurring in South Africa on R. pinnatus has any connexion with this species. No cultures have yet been attempted in this country with this rust.

P. Magnusiana differs from P. Phragmitis in its numerous small teleuto-sori, and the abundant paraphyses in the uredo-sori. The germ pores are indistinct, while in P. Phragmites they are fairly conspicuous.

128. **Puccinia Phragmitis** (Schum.) Korn.

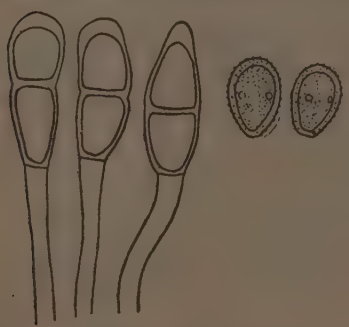
in Hedwigia, 1876, p. 179; Syd. Monogr. Ured. I, p. 787.

Syn. *Aecidium rubellum* Gmel. Syst. Nat. ii, 1473.
Uredo Phragmitis Schum. Fl. Saell. ii, 231.
Puccinia arundinacea Hedw. in D.C. Flor. fr. v. 59.
Dicaeoma rubellum Arth. et Fromme, N. Am. Flora 7, p. 322, 1920.

For complete synonymy, see Syd. *loc. cit.*
O. Spermogones, whitish.

I. Aecidia hypophyllous, on circular red or deep purple spots, 0·5–1·5 cm. diam., in dense clusters, briefly cylindrical or cupulate, with a white, lacerate, recurved margin; aecidiospores angular-globose, sub-hyaline verruculose, 16–26 μ diam.

II. Uredo-sori amphigenous, scattered or more or less grouped, elliptic-lanceolate or linear, sometimes confluent, rather large, pulverulent, convex, brown, without paraphyses. Uredospores sub-globose, ovate or ellipsoid, light brown, 25–35 × 16–26 μ; epispore about 3 μ thick, verruculose rather than echinulate, and with 4 equatorial germ pores.



Puccinia Phragmitis.
Teleutospores and uredospores.

III. Teleuto-sori amphigenous, scattered or in groups, elliptic, oblong or linear, often confluent, large, convex, thick, pulvinate, dark brown. Teleutospores oblong, usually sub-rounded at the apex, more rarely truncate or conically attenuate, sub-rounded or attenuate at the base, more or less constricted at the septum, deep yellow-brown, 45–65 × 16–25 μ, rarely up to 75 μ long; epispore smooth, about 2·5 μ thick, thickened at the apex (4–9 μ); pedicel light yellow-brown, persistent, thick, 100–200 μ long.

Hosts: I. Rheum rhaponticum L., Rosetta, Natal, Fuller [428]; Ermelo, 4.11.08, Burtt-Davy [749] and [937]; Grootfontein, Cape Province, 1924, Gill [18101].

I. Rumex conglomeratus, Bulwer, Natal, 28.10.15, Lansdell [9125].

I. Rumex Ecklonianus Meisn., Somerset East, Cape Province, March, 1877, MacOwan 1308 [20736]; Potchefstroom, 5.11.08, Pole Evans [197]; Koodoospoort, Transvaal, 16.11.08, Pole Evans [748].

I. Rumex spp., Skinner's Court, Pretoria, 3.11.09, 697; Vereeniging, Transvaal, December, 1913, Burtt-Davy [7097]; Wellington, Cape Province, 12.5.11 and 11.6.11, Bottomley [1500 and 1579.]

II. and III. Phragmites communis L., Klein Visch River, Cape Province, 1877, MacOwan [1316]; Wakkerstroom District, 23.4.05, Burtt-Davy [418]; Quelimane, Portuguese East Africa, 11.10.08, Howard [646]; Witbank, Transvaal, 3.2.11, Walters [1199]; Pretoria, 19.6.11, Pole Evans [1588]; Wolhuter's Kop, Pretoria District, 13.9.14, Maynard [8386].

Secale L.

cfr. Triticum.

Sorghum L.

129. **Puccinia purpurea** Cke.

in Grevillea V, p. 15 (1876); Syd. Monogr. Ured. I, p. 803.

Syn. *Uredo Sorghi* Fckl. in Thuem. Mykol. Notszen von Griechenland, p. 27, in Botan. Zeitung, 1871.

U. Sorghi Pass. in Hedwigia, 1875.

U. Sorghi-halepensis Pat. in Bull. Soc. Myc. France, 1903, p. 253.

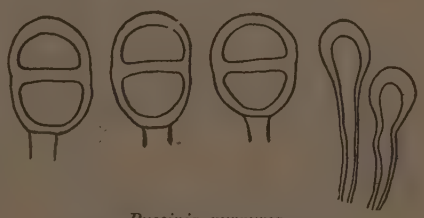
Puccinia sanguinea Diet. Bull. Cornell. Univ. III, n. 1, p. 19 (1897).

P. Penniseti Barcl. in Jour. Asiatic Soc. of Bengal LX, II, p. 215 (1891).

Dicaeoma purpurea Kuntze Rev. Gen. 3, p. 470, 1898.

II. Uredo-sori amphigenous on elongated, indeterminate spots, which are deep purple in colour and often run together, forming irregular purple blotches, scattered or in small groups, irregular, usually oblong or ellipsoid, minute or of medium size, covered by the epidermis, yellow-brown. Uredospores yellow-brown, sub-globose, ovate or pyriform, 28–40 × 20–28 μ; epispore light brown, about 1·5 μ thick, aculeate verruculose and with 4–7 scattered germ pores. Paraphyses numerous, light brown, club-shaped.

III. Teleuto-sori on the same spots as the uredo-sori, usually hypophyllous but sometimes epiphyllous, minute or of medium size, oblong, elliptic or linear, always or for a long time covered by the epidermis, red-brown Teleutospores ellipsoid, oblong or ovate-oblong, rounded at the apex, usually rounded at the base, not constricted at the septum or very slightly so, dark brown, 35–56 × 22–32 μ; epispore smooth, about 2·5–3 μ thick, usually slightly thickened at the apex; germ pore apical in the upper cell; pedicel hyaline, persistent, thick, up to 100 μ long. Paraphyses present.



Puccinia purpurea.
Teleutospores and paraphyses.

Hosts: Sorghum halepense L., on leaves, Umbelusi, Portuguese East Africa, 25.5.09, Howard [672]; Winkle Spruit, Natal, 2.7.11, and 5.6.12, Pole Evans [1599 and 2386]; Verulam, Natal, 3.7.13, Pole Evans [6803]; Esperanza, Natal, 18.1.17, Van der Merwe [10089]; Durban, 19.1.17 and 6.2.17, Van der Bijl [10090 and 10091].

Sorghum Caffrorum Beauv., Maritzburg, 7.4.11, Pole Evans [1386].

Distribution: South Africa, North and East Africa, Europe, East India, Java, North America.

Medley Woods No. 229 [10501], is Puccinia purpurea, and the host is stated to be Zea Mays. P. purpurea has not since been collected on this host, and I think it probable that Medley Wood's host is incorrectly recorded and that it is not maize but kaffir-corn or amabele (Sorghum caffrorum).

Sorghum halepense is Johnson grass, a tropical grass introduced into almost all tropical and sub-tropical countries. It is a good fodder grass, but a troublesome and aggressive weed in irrigated and cultivated lands.

Sporobolus : P. tosta Arth. recorded Bothal, 2:1674

Themeda Forsk.

cfr. Heteropogon.

Tristachya Nees.

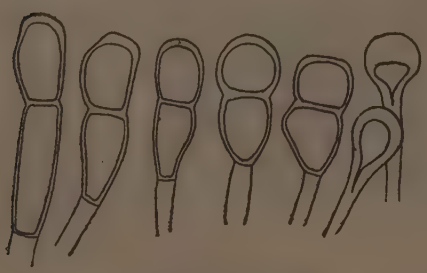
130. **Puccinia Tristachyae** n. sp.

Syn. *Aecidium decipiens* Syd. Monogr. Ured. IV, p. 223; M. Pole Evans, Rusts in South Africa, I. A sketch of the life-cycle of the rust on Besem Gras and Wild Sweet Pea. Union of South Africa, Division of Botany Sci. Bull. No. 1 of 1923.

O. Spermogones usually epiphyllous, less frequently hypophyllous or caulicolous, honey-coloured, in small groups, immersed, with protruding ostiolar filaments, about 80–110 μ diam., preceding or accompanying the æcidia.

I. Aecidia hypophyllous (rarely epiphyllous), caulicolous and even on the calyces and legumes, often covering large areas of the leaf or stem and causing some hypertrophy, very closely crowded, cupulate or briefly cylindrical, 250–300 μ diam; peridum with a white, lacerate, revolute margin; cells of the peridium firmly joined together, rhomboid, 40–50 × 15–20 μ, walls almost equally thickened (2–3·5 μ) outer wall faintly striate, inner densely verrucose. Aecidiospores oblong or ellipsoid, 26–40 × 16–20 μ, occasionally angular globose, 22–25 μ diam; wall hyaline, scarcely 1 μ thick, very closely and minutely verruculose, contents yellow.

II. Uredo-sori hypophyllous, minute, oblong, long covered by the epidermis, brown. Uredospores ovate or sub-globose, dull brown, usually with a lighter equatorial band, 28–34 × 21–30 μ; epispore brown, about 2 μ thick, delicately and rather sparsely echinulate and with 5–7 equatorial germ pores. Paraphyses numerous, capitate, hyaline or fuscous, up to 120 μ long and 20 μ broad at the swollen tips.



Puccinia Tristachyae.
Teleutospores and paraphyses

III. Teleuto-sori hypophyllous, scattered or in series, oblong to linear, up to 1·5 μ long, long covered by the epidermis, later naked, pulverulent, black. Teleutospores clavate, ellipsoid or oblong, upper cell usually shorter than the lower, rounded or truncate at the apex, rarely sub-acute, more or less constricted at the septum, attenuate or rounded at the base, golden-brown, 40–60 × 16–23 μ; epispore smooth, 1·5 to 2 μ thick in the lower cell, 2·5–3 μ thick in the upper, rarely very slightly thickened (up to 4 μ) at the apex; germ pores apical and just below the septum; pedicel persistent, rather stout, light brown, up to 45 μ long and 6·5 μ thick.

Hosts: I. Vigna angustifolia, Meintjes Kop, Pretoria, 7.12.09, Burtt-Davy [715]; Heidelberg, Leendertz [457]; Arcadia, Pretoria, 20.11.10, Burtt Davy [988 and 6580]; Garstfontein, Pretoria District, 6.11.11, Pienaar (Syd. Fung. Exot. 27) [1945 and 5220]; 20.12.11 [1989]; Kaalfontein, Pretoria District, 14.12.17, Pole Evans [11025]; Groenkloof, Pretoria District, 12.12.19, Pole Evans [12837]; Kaalfontein, Pretoria District, 12.11.20, Pole Evans [14244]; near Leper Asylum, Pretoria District, 24.12.14 [18082].

II and III. Tristachya Rehmanni Hack., Kaalfontein, Pretoria District, 13.2.17, Pole Evans [10039]; Kaalfontein, 22.2.18, Mogg [11655]; 20.1.20, Pole Evans [12842].

The connection between the aecidium on Vigna angustifolia and the teleutostage on Tristachya Rehmanni was proved by M. Pole Evans (*loc. cit.*) who established the fact by culture experiments; this is the only indigenous South African rust of which he life history has been established by experiment.

Triticum L.

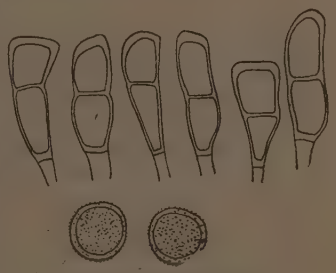
131. **Puccinia dispersa** Erikss. et Henn.

De Getreideroste, p. 210 et in Deutsch Bot. Ges., 1894, p. 315 p.p.; Syd. Monogr. Ured. I, p. 709.

Syn. *Aecidium Anchusae* Erikss. and Henn. Die Getreideroste, p. 210.
Ae asperifolii Pers. Syn. Fung., p. 208 pp.
Puccinia straminis Cke. Micr. Fung., p. 202 pp.
P. Rubigo-vera Wint. Pilze, p. 217 pp.; Plowr. Monogr. Ured. I, p. 167 pp.
P. asperifolii Wetts. Verhandl. Zool-bot. Ges. Wien., 1885, p. 158 pp.

II. Uredo-sori mostly epiphyllous, or a few hypophyllous, scattered irregularly, rarely confluent, oblong or linear, minute, 0·5–2 mm. long, rusty brown. Uredospores sub-globose, 22–30 μ diam., dirty-yellow or dull orange; epispore brownish when mature, 1·5-2 μ thick, finely and closely echinulate, with 7–10 scattered germ pores.

III. Teleuto-sori hypophyllous or on the sheaths, scattered or in small irregular groups, rarely in distinct lines, small, oblong, covered by the epidermis, black. Teleutospores oblong to clavate, apex truncate, rounded or obtusely acuminate, often oblique, gently constricted at the septum, attenuate at the base, light brown, often darker at the apex, 35–56 × 12–24 μ; epispore smooth 2 μ thick in upper, 1 μ thick in lower cell, thickened at the apex (up to 5 μ); germ pores obscure, apical in the upper cell and in the lower just below the septum; pedicel persistent continuous with the spore, coloured, short and thick, up to 20×6·5 μ. Paraphyses numerous brownish, more or less curved, surrounding the sori, or in the larger ones dividing them into loculi.



Puccinia dispersa.
Teleutospores and uredospores.

Hosts: Secale cereale L., on leaves and sheaths, Pretoria, 24.2.07 [254]; Cedara, Natal, 13.11.11, and 1.11.11, Fisher, 1917 [2245]; Koodoo's Poort, Pretoria District, 2.10.15, Pole Evans [8078].

Secale Africanum Stapf., Jakhals Vallei, Cape Province, 16.10.20, Marloth [14677].

Triticum vulgare L., Skinner's Court, Pretoria District, 1.5.06 [29 and 61]; Salisbury, Rhodesia, 28.5.11, Mundy [1651]; Cedara, Natal, 13.11.11, Fisher [1916]; Groenkloof, Pretoria, December, 1915, Melle [9189].

Distribution: South Africa, Australia, New Zealand, Europe, Asia Minor, North America.

The general description given above includes the forms known as "brown rust" on various hosts, originally included under the name P. dispersa. This species has been divided by Eriksson into a number of forms which differ chiefly on biological grounds, and these are often considered distinct species. Seven of these species are recognized, namely:—

(1) *Puccinia dispersa* (*sens. strict.*) Erikss., aecidia on Anchusa, uredo- and teleutospores on Secale cereale.
(2) *Puccinia bromina* Erikss., aecidia on Symphytum; uredo- and teleutospores on Bromus spp.
(3) *Puccinia triticina* Erikss; aecidium unknown, uredo- and teleutospores on Triticum.
(4) *Puccinia holcina* Erikss; aecidium unknown; on Holcus spp.
(5) *Puccinia agropyrina* Erikss; aecidium unknown; on Agropyron spp.
(6) *Puccinia triseti* Eriks., aecidium unknown; on Trisetum.
(7) *Puccinia simplex* Er. et Henn.; aecidium unknown; on Hordeum spp.

These seven races are distinguished almost entirely by their hosts plants; the aecidial stage of the last five is unknown, but may yet be discovered. Pole Evans (the cereal rusts. I. The Development of their Uredo Mycelia. Ann. Bot. XXI, 443, 1907) has shown that they present minute differences in the mode of germination of their uredospores, but at present it is an open question whether the seven forms should be considered as distinct species, or whether they should be regarded as biologic forms of a single species P. dispersa. In the absence of any cultural work in South Africa, and of any information about the aecidial forms, the latter course has been adopted.

132. **Puccinia graminis** Pers.

Disp. Meth., p. 39 (1797) et p. 228; Syd. Monogr. Ured. I, p. 692.

Syn. *Aecidium Berberidis* Gmel.; Cooke Handbook, p. 538; Micr. Fung., p. 195.

Dicaeoma poculiforme Kuntze, Rev. Gen. 3, p. 466, 1698.

(For complete synonymy see Sydow, *loc. cit.*)

[O: Spermogones in small clusters, honey-coloured.

I. Aecidia hypophyllous, often also on the fruit, on roundish, often thickened spots, 2–5 mm. diam., clustered or scattered, cylindrical, margins of the peridia white, with a cut and somewhat erect margin. Aecidiospores angular-globose, 14–26 μ diam., epispore hyaline, finely and densely verruculose, contents sulphur-yellow.]

II. Uredo-sori amphigenous, often also on the sheaths and culms, scattered or in rows, linear, 2–3 mm. long, often confluent, bullate, pulverulent, surrounded by the epidermis, which splits longitudinally, reddish-brown. Uredospores ellipsoid or ovate-oblong, yellow-brown, 22–42 × 16–22 μ; epispore golden-brown, 1·5–2 μ thick, echinulate, and with 3–4 equatorial germ pores.

Puccinia graminis.
Teleutospores and uredospores.

III. Teleuto-sori usually on sheaths and stems, similar to the uredo-sori, but forming long lines, pulvinate, black, conspicuous, soon becoming naked. Teleutospores chestnut-brown, oblong-clavate, acuminate, rounded or often oblique at the apex and more deeply coloured than the rest of the spore, base attenuate, constricted at the septum, 35–70 × 14–25 μ; epispore smooth, up to 3 μ thick, strongly thickened at the apex (up to 13 μ), germ pores apical and just below the septum; pedicel brownish, persistent, thick, up to 60 μ long. No paraphyses.

Hosts: Agrostis lachnantha Nees, Mount Hope, Upper Zwartkei, Cape Province, 13.3.00, Galpin 5609 [20452].

Avena sativa L., on blades and culms, Standerton, February, 1906, Wyndham [74]; Skinner's Court, Pretoria District, 5.2.06 and January, 1907 [85 and 213]; Potchefstroom, 8.7.07, [241 and 242]; Standerton, November, 1905 [386]; Skinner's Court, Pretoria District, 27.5.08 [474]; without locality, 27.11.06 [18057].

Dactylis glomerata L., Skinner's Court, Pretoria District, 9.1.07, Pole Evans [247]; Salisbury, Rhodesia, 28.5.11, Mundy [1650].

Festuca pratensis Huds., Amsterdam, Transvaal, 23.5.08 and 16.5.08, Buchanan [744 and 1170].

Hordeum murinum, Orange Free State, 7.4.09, van der Merwe [906].

Hordeum secalinum, Zandfontein, Middelburg, Cape Province, March, 1907, Pole Evans [288].

Hordeum vulgare, Skinner's Court, Pretoria District, 5.2.06 [82]; Potchefstroom, November, 1910, Burtt Davy [1045].

Lolium temulentum L., Kluitze's Kraal, Cape Province, 12.12.06, Pole Evans [211].

Secale cereale L., Skinner's Court, Pretoria District, 28.2.07 [264].

Triticum sativum L., Orange Free State, 10.3.10 [778].

Triticum vulgare L., Skinner's Court, 5.2.06, Pole Evans [78 and 80]; Doornfontein, near Zeerust, Burtt Davy [948]; Potchefstroom, 28.2.06 [954]; Bethlehem, Orange Free State, 2.1.11, van der Merwe [1071]; Salisbury, Rhodesia, 28.5.11, Mundy [1648]; Groenkloof, Pretoria District, January, 1914, Turner [7371]; Pretoria, 25.1.15, Pole Evans [8911]; Gazaland, Southern Rhodesia, 9.9.17, Swynnerton [10713]; Kingwilliamstown, Cape Province, 13.12.12, Sellschop [11799].

Distribution: World-wide.

The alternate host of P. graminis, the Barberry, is not indigenous to South Africa, and is found only rarely in cultivation. The aecidial stage is therefore unknown in South Africa, yet the black rust of wheat abounds in this country and is as destructive as in any other part of the world. The same remark applies to Australia, New Zealand, and parts of India, where no species of Berberis are indigenous. MacAlpine was unable to infect Barberry plants imported from England with the Australian form of Puccinia graminis, and the same result was obtained with the South African form in experiments carried out at Pretoria by I. B. Pole Evans and M. Pole Evans, of which the results have not been published. MacAlpine concludes that the wheat rust of Australia may be a biological race which has lost the power of producing aecidia owing to the absence of the aecidial host. More recently, however, Waterhouse (Jour. and Proc. R. Soc., New South Wales, IV., pp. 278–288, 1921) has succeeded in inoculating plants of Berberis vulgaris with sporidia of Puccinia graminis from New South Wales, and although these results were obtained in highly artificial conditions, they show that Puccinia graminis on wheat in Australia has not lost its power of producing the aecidial stage on the barberry.

It follows that in South Africa Puccinia graminis must be carried over from year to year by means of its uredospores, which retain their viability for a considerable time in a warm climate, or that wheat can be infected by uredospores from grasses.

Eriksson divided this species into six biological races, each of which was supposed to be incapable of infecting any other host than that on which it is found, but the work of subsequent investigators has thrown grave doubt on the reality of these races, and it would appear that specialization is not so rigid as Eriksson indicated. Recent work by Stakman and Piemeisel in America (1918) has shown that uredospores from certain grasses are capable of infecting cereals in the spring.

In South Africa, wheat is a winter crop, and in the summer rainfall area where the winter months are dry, attacks of rust may be evaded by planting early varieties which mature before the rains begin. In the winter rainfall area the question of immune varieties is of greater importance, and is one which should be receiving attention. Biffen (1905,1907, 1912), working at Cambridge, found that immunity and susceptibility to the attacks of rust are definite Mendelian characters, the latter being dominant, and he devoted a great deal of research to the subject of breeding a race of wheat which will be immune to rust. Pole Evans (1911) carried out a number of experiments at Pretoria along similar lines to those of Biffen at Cambridge, but was unfortunately not able to continue this line of work. It is essential that the breeding of immune varieties should be carried out in this country, a variety may be immune in one country and may be susceptible under different climatic conditions.

Zea L.

133. Puccinia Maydis Bereng.

in Atti VI, Sc. ital. Milano, 1844, p. 475; Syd. Monogr. Ured. I, p. 830.

Syn. *Aecidium Oxalidis* Thuem., Flora 59, p. 425 (1876).

Ae. Peyritschianum, Magnus, Ber. Nat. Med. Ver. Innsbruck 21, p. 34 (1894).

Puccinia arundinacea var. *Maydis* Cast. Catal. I, p. 199, 1845.

P. Maydis Pötsch. in Bad. Krypt. n. 605.

P. Maydis Carradori in Wint. Pilze, p. 181.

P. Zeae Bereng. in Klotzsch. Herb. Myc. (1845).

P. Zeae Rabh. in Fg. Eur. no. 1688.

P. Sorghi, Schw. N. Amer. Fg., p. 295 (1834); Arth. et Holw. in Bull. Lab. Nat. Hist. Iowa, 1898, p. 400.

Uredo Zeae Desm. in Ann. Sc. Nat. XIII, p. 182, 1840.

Dicaeoma Sorghi Kuntze, Rev. Gen., 31, p. 470, 1898.

O. Spermogones epiphyllous, in small groups, honey-yellow.

I. Aecidia mostly hypophyllous, very rarely epiphyllous, in small, more or less circular groups, closely crowded, minute, up to 400 μ diam., cupulate; margin of the peridium erect, irregularly lacerate or entire; cells of the peridium rhomboid, firmly connected, 20–25 × 13–16·5 μ, outer wall faintly striate, 6–6·5 μ thick, inner verruculose, 3–3·5 μ thick. Aecidiospores angular-globose or ellipsoid, 18–26 × 14–20 μ; epispore hyaline, 1–1·5 μ thick, very finely and closely verruculose.

II. Uredo-sori amphigenous, scattered, elliptic or oblong, up to 1 mm. long, or becoming confluent and forming longer lines, long covered by the blistered epidermis, which finally splits longitudinally, cinnamon-brown. Uredospores globose or sub-globose, 24–32 × 20–28 μ; epispore cinnamon-brown, 1·5–2 μ thick, delicately and sparsely echinulate, and with 2–3 equatorial germ pores on one face.

Puccinia Maydis.
Teleutospores and one mesospore.

III. Teleuto-sori amphigenous, scattered, usually 1–2 mm. long, linear or oblong, or becoming confluent and forming lines 5–18 mm. long, long covered by the blistered epidermis, which finally splits longitudinally, pulvinate, black. Teleutospores oblong, ellipsoid or sub-clavate, bright chestnut-brown, rounded or bluntly acuminate at the apex, slightly constricted at the septum, rounded or sub-attenuate at the base, 30–45 × 16–24 μ; epispore smooth, 2–2·5 μ thick, slightly thickened at the apex (up to 8 μ); germ pore in the upper cell apical, conspicuous, basal pore immediately below the septum, obscure; pedicel persistent, yellowish, up to 90 μ long.

X. Mesospores occasional, ovoid to ellipsoid, chestnut-brown, 30–40 × 16–18 μ.

Hosts: I, Oxalis corniculata L., Somerset East, December, 1876, MacOwan 1295; Skinner's Court, Pretoria District, 17.11.10 [1004]; Greenhouse, Pretoria (artificial inoculation), August, 1911, Pole Evans [1846]; Skinner's Court, 30.11.11, Doidge [1926].

II and III, Zea Mays L., Inanda, Natal, January, 1822, Medley Wood 669 [10591]; Catembe, Portuguese East Africa, 1.4.09, Howard [627]; Vereeniging, Transvaal, 22.2.08, Burtt Davy [952, 950]; Oudehout's Kloof, Volksrust, 7.3.08, Burtt-Davy [951]; Amersfoort, Carolina District, 24.4.05, Burtt Davy [953]; Stellenbosch, 16.12.10, Burtt-Davy [1050]; Rhodesia, 18.3.10, Mundy [891]; Skinner's Court, Pretoria District, January, 1911, Pole Evans [1191]; Maritzburg, Natal, 7.4.11, Pole Evans [1384]; Kentani, Cape Province, 23.2.12, Pegler [2138]; Maclear, Cape Province, 28.2.12, Pienaar [2224]; Potchefstroom, Transvaal, 11.5.12, van der Bijl [2324]; Bloemfontein, Orange Free State, April, 1916–17, Potts 9753 [11312]; Kliptown, near Johannesburg, 20.2.12, Thomas [17022]; Pretoria, 26.3.23, Doidge [17070]; Groenkloof, Pretoria District, 22.3.17 [18088].

II and III, Euchlena mexicana Schrad, Groenkloof, Pretoria District, 17.4.14, Turner [7805].

Distribution : South and tropical Africa, Europe, North and South America, Australia, New Zealand.

The heteroecism of P. Maydis was first established by Arthur (1904, p. 64), who sowed aecidiospores from Oxalis cymosa L. on maize leaves and obtained uredo-sori in five days; from this he concluded that Ae. Oxalidis is the aecidial stage of P. Maydis. Amongst Sydow's exsiccata of the Uredineae (No. 2173) is a specimen of an aecidium on Oxalis stricta L., which, it is stated, was produced by inoculation with teleutospores of Puccinia maydis. In 1910, I. B. Pole Evans working at Pretoria, inoculated young maize plants with aecidiospores from Oxalis corniculata and obtained abundant uredo-sori in 9–10 days; the results of these experiments were not published, and were confirmed by M. Pole Evans in 1923 (M. Pole Evans, 1923). Aecidia were produced on Oxalis corniculata by inoculation with sporidia of P. Maydis, but other species of Oxalis tested—namely Oxalis tenuifolia, O. livida, O. lateriflora, O. variabilis, O. balsamifera, O. monophylla, O. hirta and six undetermined species—gave negative results.

Other records of Ae. Oxalidis in South Africa are on the following hosts::

Oxalis purpurata Jacq., MacOwan, 1142 [11196]; Natal, Medley Wood 453, [10300].

Oxalis setosa E. Mey., Wellington, Cape Province, 14.9.08, Stoneman [506]; Mbabane, Swaziland, January, 1905, Burtt Davy [188].

Oxalis sp., Harrismith, Orange Free State, 31.3.11, van der Merwe (1252].

So far as I am aware, no culture experiments have been carried out with the maize rust and O. purpurata or O. setosa.

DIORCHIDIUM Kalch.

in Grev. XI, 1882, p. 26.

Like Puccinia in every respect, except that the teleutospore has a longitudinal septum.

Two South African species.

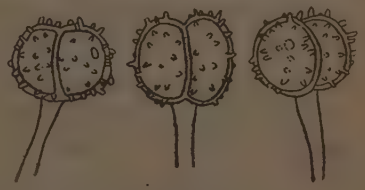
It is a question whether this genus should be retained; in many species of Puccinia there is a tendency to an oblique or even a longitudinal septum; this genus is at present retained for those species in which the large majority of the teleutospores are divided longitudinally.

1. **Diorchidium Woodii** Kalch. et Cke.

in Grevillea XI, p. 26.

Syn. *Puccinia Woodii* (Kalch. et Cke.) Syd. Monogr. Ured. I, p. 836.

III. Teleuto-sori hypophyllous, only an occasional one being found on the upper surface of the leaf, not on leaf-spots, or leaf-spots small and scarcely discernable, scattered, round to elliptic or irregular in outline, black, flat, free pulverulent. Teleutospores chestnut-brown, broadly ellipsoid, deeply constricted at the vertical septum, 27–36 × 26–33 μ; epispore about 2 μ thick, not thickened at the apex, aculeate, emergences irregular in form and position, light brown, blunt, up to 3 μ high and 1–2 μ thick; germ pores lateral, rather nearer to the apex than to the pedicel; pedicel persistent, straight or flexuose, up to 100 μ long, light brown near the apex and 8·5 μ thick, hyaline and tapering towards the base.



Diorchidium Woodii. Teleutospores.

X. Mesospores rare.

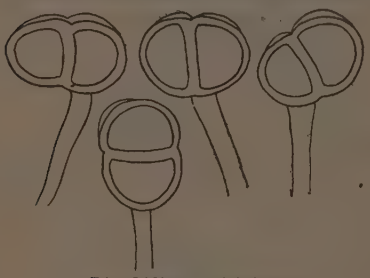
Host; Milletia caffra Meisn., Tongaat, Natal 1880, Medley Wood 70 [10448, 335 and 10449]; Winkle Spruit, Natal, 2.7.11, Pole Evans [1593]; Amanzimtoti, Natal, 10.7.11 [1601]; Winkle Spruit, Natal, 29.11.11, Pole Evans [1978]; 6.7.12, Doidge [2515]; Port Shepstone, Natal, 15.10.12, Pole Evans [5606].

Distribution: South Africa.

2. **Diorchidium Tricholaenae** Syd.

in Ann. Myc. X (1912), p. 33.

II. Uredo-sori amphigenous, but mostly hypophyllous, scattered or in rows, oblong to linear minute, up to 1 mm. long, light brown, partially veiled by the epidermis which splits longitudinally. Uredospores sub-globose, ovate or broadly ellipsoid, dull-brown, 23–30 × 20–23 μ; epispore brown, about 1·5 μ thick, often thicker (up to 5 μ) at the base, briefly and finely echinulate, and with two equatorial germ pores.



Diorchidium Tricholaenae.
Teleutospores

III. Teleuto-sori hypophyllous, scattered or in rows, oblong or linear, up to 1·5 mm. long, black, surrounded by the torn epidermis. Teleutospores chestnut-brown, ellipsoid to oblong, constricted at the septum, which is usually vertical, often oblique and rarely horizontal, 34–44 × 23–30 μ; epispore smooth, 3–3·5 μ thick, thickened at the apex (up to 7 μ); germ pores apical, subpapillate; pedicel persistent, hyaline slightly tinted near apex, straight or somewhat flexuous, 6–7 μ thick and up to 140 μ long.

Host: Tricholaena rosea Nees., Barberton, 9.6.03 [269]; Harden Heights, Natal, 11.4.11, Pole Evans [1449]; Winkle Spruit, Natal, 3.7.11, Pole Evans [1605]; Amanzimtoti, Natal, 10.7.11, Doidge [1607]; Winkle Spruit, Natal, 5.6.12, Pole Evans [2393]; Winkle Spruit, 6.7.12, Doidge [2512].

Distribution: South Africa.

SPHAEROPHRAGMIUM P. Magn.

Berichte d. Deutsch. Bot. Gesellschaft IX, 1891, p. 121.

I. Aecidia none.

II. Uredospores, when present, ovate, ellipsoid or pyriform, verruculose or echinulate, solitary, and with several germ pores.

III. Teleutospores globose, ovate or ellipsoid, with muriform septa, composed of 4–9 cells, adorned on the surface with simple aculeae, or with appendages of varying length which are often barbed, each cell with one or more germ pores. Promycelium typically four-celled.

A small genus of five known species of which four are on Leguminosae. Only one species is known to occur in South Africa.

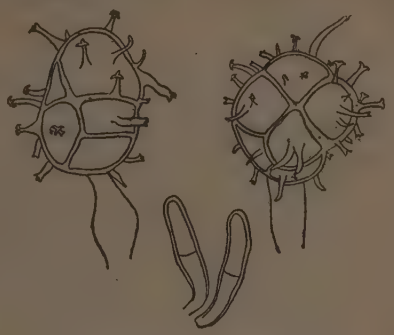
Sphaerophragmium Dalbergiae Diet.

in Hedwigia XXXII, 1893, p 30; Syd. Monogr. Ured. III, p. 186.

II. Uredo-sori hypophyllous, on indistinct yellow spots, scattered, yellow, very minute, 0·1–0·2 mm. diam., at first covered by the epidermis, then opening by a round pore. Uredospores ovate or pyriform, pale yellow-brown, 23–34 × 13–20 μ; epispore 1·5 μ

thick, briefly and sparsely echinulate, and with two germ pores. Paraphyses produced at the margin of the sorus, cylindrical or sub-clavate, hyaline or pale yellow, with a medial septum, 7–10 μ thick and about 50–60 μ long, usually abruptly bent near base, thick-walled.

III. Teleuto-sori, similar to the uredo-sori, but darker. Teleutospores globose, sub-globose or ellipsoid, composed of 6–9 cells, chestnut-brown, 33–50 × 32–43 μ; the surface being rather sparsely set with light brown appendages, which are up to 20 μ long, tapering somewhat from base to apex, apex 2–3 furcate, teeth reflexed. Single cells 15–24 μ in diam; pedicel hyaline, persistent stout, about 10 μ thick, and up to 80 μ long.



Sphaerophragmium Dalbergiae.
Teleutospores and paraphyses.

Host: Dalbergia armata E. Mey., near Umgeni Lagoon, Durban, 21.3.10, Doidge [881]; Durban, 13.4.11, Pole Evans [1371]; Umgeni Beach, Durban, 7.7.12, Doidge [2524]; Bluff, Durban, 2.8.12, Pole Evans [5144]; Verulam, Natal, 3.7.13, Pole Evans [6835.

Distribution: Natal.

HEMILEIA Berk et Broome.

in Gardener's Chronicle, 1869, p. 1157.

O.I. Aecidia and spermogones not known.

II. Uredo-sori sub-epidermal, very minute, erumpent through the stomata, without peridium. Uredospores borne singly at the tips of fasciculate hyphae, which are erumpent through the stomata or on short pedicels which arise from an erumpent column of agglutinated hyphae, ovate or reniform, dorsiventral, the upper part verrucose, the lower smooth, pale yellow; germ pores obscure or absent.

III. Teleuto-sori sub-epidermal, very minute. Teleutospores borne singly on pedicels in the same way as the uredospores, smooth, one-celled, angular-globose or irregularly angular, hyaline or sub-hyaline, germinating immediately to form a four-celled promycelium.

The genus Hemileia consists of twenty-three known species, which occur chiefly in the tropics of both hemispheres. There are seven South African species of which six are on Rubiaceae.

Species parasitic on **Rubiaceae.**

Ancylanthus Desf.

1. **Hemileia Ancylanthi** Syd.

in Monogr. Ured. III (1915), p. 208.

Syn. *Uredo Ancylanthi* P. Henn. in H. Baum. Botanische Ergebnisse der Kunene-Sambesi Expedition 1906, p. 158.

II. Uredo-sori hypophyllous, very minute, scattered or in groups, orange-yellow. Uredospores asymmetrically ovate or reniform, the upper surface convex, briefly aculeate; the lower surface flat or even concave, smooth, hyaline or yellow, 24–35 × 20–26 μ; epispore 1·5 μ thick.

III. Teleutospores not known.

Host: Ancylanthus fulgidus Welw. Quiriri River, South-West Africa, Baum.

This fungus of which the type was collected on the Kunene-Sambesi Expedition is not represented in the National Herbarium.

Canthium Lam.

cfr. Plectronia.

Coffea L.

2. **Hemileia vastatrix** Berk. et Br.

in Gardener's Chronicle 6, Nov., 1869, p. 1157 ; Syd. Monogr. Ured. III, pp. 209–212.

Syn. *Uredo Gardeniae-Thunbergiae* P. Henn. in H. Baum, Botan. Ergebnisse der Kunene-Sambesi, Exped., 1903, p. 160.

II. Uredo-sori hypophyllous on yellow-brown leaf-spots which later become dark brown; orange-yellow, very minute, about 0·1 mm. diam., but developing centrifugally in large closely crowded circular groups which are more or less effuse and which often by confluence cover a large part of the lower surface of the leaf. Uredospores borne at the apex of hyphae which break out in tufts through the stomata, pale yellow, bi-facially ovate or reniform, the upper side convex, coarsely aculeate, the lower side flat or slightly concave, smooth, 26–40 × 20–30 μ.

Hemileia vastatrix.
Uredo-sorus.

III. Teleutospores mixed with the uredospores, very rare, angular-globose or angular, smooth, hyaline, 18–28 × 14–22 μ.

Host: Coffea arabica L., on leaves and less frequently on fruits, Tzaneen, Northern Transvaal, March, 1906, Pole Evans [5, 42 and 59], June, 1906 [172]: Riet Valley Estate, Natal, Medley Wood [323]: Botanic Gardens, Durban, February, 1906, Medley Wood [349 and 372]; Lemana, Northern Transvaal, 20.8.08, Pole Evans [991]; Winkle Spruit, Natal, 13.4.11, Pole Evans [1403]; Verulam, Natal, 3.7.13, Pole Evans [6824]; Verulam, 20.5.14, James [7788]; Gazaland, Southern Rhodesia, August, 1917, Swynnerton [10709]; Tzaneen, 11.1.25, Doidge [20322].

Distribution: South and Central Africa, Costa-Rica, Porto Rico, Madagascar, East India, Ceylon, Java, Sumatra, Philippine Islands, China, Japan, Samoa, Fiji Islands, New Hebrides, New Caledonia.

This is the famous coffee leaf disease to which is attributed the ruin of the coffee planting industry in Ceylon and in South Africa. It was first noticed in Ceylon in 1868, and was probably in Natal as early as 1878. It was at first supposed that the outbreak in Natal was due to infection by spores from some indigenous plant, and when a similar species, Hemileia Woodii, was found occuring freely on two common shrubs, Vangueria infausta and Vangueria latifolia, Massee stated that if opportunity offered the parasite would pass from the Vangueria to coffee and that to start a coffee plantation in the neighbourhood would in all probability mean disaster. Attempts were made by Pole Evans (Ann. Rept. Trans. Dept. Agric., 1906-7, p. 165) to infect coffee with species such as Hemileia Woodii from Vangueria infausta, and vice versa, but such inoculations gave only negative results.

In Central Africa H. vastatrix has been found on indigenous plants of Coffea robusta in the Victoria Nyanza region and elsewhere, it seems likely, therefore, that the rust originated in Africa and has spread by transporting living plants from one place to another.

Certain varieties of coffee have been found which are more or less resistant to the disease, and there is now some prospect of successfully fighting the Hemileia by the planting of such varieties, and paying attention to suitable cultural methods.

Fadogia Schweinf.

Pachystigma Hochst.

3. **Hemileia Fadogiae** Syd.

in Ann. Myc. X (1912), p. 34; Monogr. Ured. III, p. 212.

Syn. *Uredo Fadogiae* P. Henn. in Annal. Musée Congo Ser. V, Vol II, Fasc. II, p. 94 (1907)

II. Uredo-sori hypophyllous, very minute, pale yellow, densely clothing smaller or larger portions of the leaf, or even covering the whole of the lower surface. Uredospores arising at the tips of fasciculate hyphae, which break through the stomata, usually reniform, sub-hyaline, the upper being very finely verrucose and the lower smooth, 22–38 × 16–25 μ.

III. Teleutospores mixed with the uredospores, rare, hyaline, ovate or obtusely 3–5 angled, smooth, smaller than the uredospores, about 20–23 × 15–20 μ; wall very thin.

Hosts: Fadogia Cienkowskii Schw., Mbabane, Swaziland, 8.3.10, Miller [757]; Nelspruit, Transvaal, 25.2.14, Pole Evans [7391]; Gazaland, Southern Rhodesia, August, 1917, Swynnerton [10710].

Pachystigma (Fadogia) Zeyheri Sd., Heidelburg, Transvaal, 8.4.07 [281]; Meintjes Kop, Pretoria, 21.3.19, Pole Evans [12229]; The Willows, Pretoria District, 6.4.12, Pole Evans [2209].

Distribution: South and Central Africa.

Teleutospores are rarely developed, I have only seen three or four, and Sydow (*loc. cit.*) states that he saw only two in the material which he examined.

Plectronia L.

4. **Hemileia Canthii** Berk. et Br.

in Journ. Linn. Soc. Botany XIV, 18 5, p. 93; Syd. Monogr. Ured. III, p. 212.

Syn. *Coleosporium detergibile* Thuem. in Flora 1875, p. 379.

Uredo detergibilis P. Henn, in H. Baum. Botan. Ergebnisse der Kunene-Sambesi Exped., 1903, p. 160.

II. Uredo-sori hypophyllous, very minute, scattered or irregularly grouped, orange-yellow. Uredospores arising at the tips of erumpent fasciculate hyphae, bilaterally ovate or reniform, upper surface convex, verrucose-aculeate, lower smooth, flat or concave, hyaline or yellowish, 25–38 × 18–25 μ.

III. Teleuto-sori similar to the uredo-sori, but pale. Teleutospores angular-globose or angular-ovate, often drawn out into 3–5 obtuse angles, smooth, hyaline, 18–25 × 16–20 μ.

Host: Plectronia sp., on leaves, Wyebank, Natal, 29.5.15, Doidge [9084].

Distribution: South Africa, India, Ceylon, Philippine Islands.

Tricalysia A. Rich.

5. **Hemileia Evansii** Syd.

in Ann. Myc. X. (1912) p. 34; Monogr. Ured. III, p. 214.

II. Uredo-sori hypophyllous on indeterminate, pale leaf-spots, more or less closely crowded, ochraceous-yellow, very minute. Uredospores borne at the tips of fasciculate, erumpent hyphae, irregularly ellipsoid to reniform, upper part minutely verruculose, lower smooth or nearly so, hyaline, 24–36 × 17–24 μ.

III. Only a few small immature teleutospores have been seen; these were hyaline and smooth.

Hosts: Tricalysia capensis Sim., Swaziland, 26.5.08, Miller [590].
Tricalysia Sonderiana Hiern., Natal, 9.5.13, Doidge [6635].

Distribution: Natal and Swaziland.

Vangueria Juss.

6. **Hemileia Woodii** Kalch. et Cke.

in Grevillea IX, 1880, p. 22; Monogr. Ured. III, p. 214.

Syn. *Uredo Vangueriae* Cke. in Sched.

II. Uredo-sori hypophyllous, minute, round, orange-yellow, scattered or more or less grouped. Uredospores arising at the tips of fasciculate, erumpent hyphae, bilaterally ovate, convex surface aculeate, lower part flat or slightly concave, hyaline or yellowish, 20–34 × 18–28 μ.

III. Teleuto-sori hypophyllous, gelatinous, with the same distribution as the uredo-sori. Teleutospores arising at the tips of sterigmata, closely packed at the surface of a columnar body composed of a number of strongly connected cells, at first sub-globose, then umbonate at the apex, and finally angular-globose or angular-ovate, smooth, hyaline, thin-walled, but often up to 3 μ thick near point of attachment, 20–33 × 16–25 μ.

Hosts: Vangueria latifolia Sond., Natal, Medley Wood 8 and 540 [340, 814, 10600, 10549, 11185 and 10600]; Winkle Spruit, Natal, 13.4.11, Pole Evans [1404]; Winkle Spruit, 14.2.13, Pole Evans [5640]; Scottsburgh, Natal, 5.7.13 Pole Evans [6835]; Krantzkloof, Natal 7.4.15, Doidge [8250]; New Hanover, Natal, 5.7.16, Rabie [9762]; Entumeni, Zululand, June, 1916, Haygarth [14177].

Vangueria infausta Burch., Natal, 26.4.99, Medley Wood [352, 324 and 10401]; Barberton, 4.2.11 Pole Evans [1154]; Barberton, 21.3.11, Lounsbury [1277]; Table Mt., Natal, 28.5.11, Fuller [1679]; Letaba Drift, Northern Transvaal, 6.8.11, Doidge [1815]; Cramond, Natal, 3.6.2, Pole Evans [2446]; Winkle Spruit, Natal 6.7.12, Doidge [2497]; Louis Trichardt, 8.4.19, Putterill [11845]; Salisbury, Rhodesia, February, 1920, Eyles [14014].

Species parasitic on the **Verbenaceae.**

7. **Hemileia Scholzii** Syd.

in Engler's botan. Jahrbucher XLV, 1910, p. 260; Monogr. Ured. III, p. 216.

Syn. *Uredo Scholzii* P. Henn. in Engler's botan. Jahrbuch. XXXIII, 1902 p. 34.

II. Uredo-sori hypophyllous, on pale indeterminate leaf-spots, very minute, but densely crowded and forming more or less effuse spots, pulverulent, orange-yellow. Uredospores arising at the tips of short sterigmata at the surface of a columnar body which is composed of numerous thick-walled cells, which are strongly joined together, bilaterally ovate, convex surface aculeate, lower part more or less flat, smooth or nearly so, hyaline or yellowish, 20–32 × 18–25 μ; epispore 1·5–2 μ thick

III. Teleutospores intermingled with the uredospores, angular globose or triangular, with slightly concave sides, smooth, hyaline, 18–24 × 14–20 μ

Host: Clerodendron glabrum E. Mey, Amanzimtoti, Natal, 10.7.11, Doidge [1569 and 1570].

RAVENELIA Berk.

in Gardener's Chronicle X, 1853, p. 132.

O. Spermogones sub-cuticular, hemispherical or flattened-conical.

I. Aecidia, when present, with a peridium.

II. Uredo-sori often minute, sub-cuticular or sub-epidermal, often paraphysate, peridium none. Uredospores globose to oblong or sub-fusiform, borne singly, echinulate or verrucose and with several germ pores.

III. Teleuto-sori often minute, sub-cuticular or sub-epidermal. Teleutospores firmly united, and forming a head bearing cystidia; pedicel of the teleutospore head composite, or consisting of several free hyphae. Teleutospores on germination form a non-septate mycelium, bearing sub-globose sporidia.

Distribution: The genus Ravenelia is confined to the tropical and sub-tropical regions of America, Asia, and Africa; none are known in Australia or in Europe. The majority of the species are parasitic on Leguminosae, comparatively few occur on Euphorbiaceae and Tiliaceae. Of the twenty-one species known to occur in South Africa, twenty are on plants of the family Leguminosae, and of these ten are on various species of Acacia.

Key to the Species.

I. Single spores of the teleutospore head 1-celled, Section I..... HAPLORAVENELIA.
- A. Cystidia equal in number to the marginal spores.
  - *a*. Spores smooth..... 8. R. Bottomleyae.
  - *b*. Spores with small verruciform papillae.
    - 1. Heads with 4–6 spores on every diameter 7. R. pretoriensis.
    - 2. Heads with 6–8 spores on every diameter 1. R. escharoides.
    - 3. Heads with 7–10 spores on every diameter 6. R. Pienaarii.
  - *c*. Spores with 4–8 aculeae, 4–6 μ long..... 2. R. Evansii.
- B. Cystidia equal in number to the single spores.
  - *a*. Spores smooth.
    - 1. Heads 60–110 μ diam. (on Acacia)..... 5. R. Peglerae.
    - 2. Heads 50–105 μ diam. (on Elephantorhiza) 13. R. Elephantorhizae.
  - *b*. Each spore with a single papilla or appendage.
    - 1. Appendage small, 1–2 μ high..... 12. R. Le Testui.
    - 2. Appendage larger, cylindrical, 5–12 μ high 11. R. Baumiana.
  - *c*. Each spore with several papillae.
    - 1. Heads composed of 3 internal and 6 marginal spores..... 9. R. minima.
    - 2. Heads with 3–4 (rarely 5) spores on every diameter..... 10. R. Dichrostachydis.
    - 3. Heads with 8–12 spores on every diameter 3. R. inornata.
- C. Cystidia varying in number, or number not recorded.
  - *a*. Spores smooth, cystidia varying in number... 4. R. natalensis.
  - *b*. Spores with a few verrucae near the margin; number of cystidia not recorded..... 14. R. Woodii.

II. Central spores of the teleutospore head 2-celled, Section II..... PLEORAVENELIA.
- *a*. Spores smooth
  - 1. Heads with 4–9 spores on every diameter.
    - x. Heads 120–160 μ diam. (on Calpurnia). 17. R. glabra.
    - xx. Heads 60–120 μ (diam. (on Acacia)
      - *a*. Uredospores with 4 equatorial germ pores..... 16. R. MacOwaniana.
      - *b*. Uredospores with numerous scattered germ pores..... 15. R. deformans.
  - 2. Heads with 15–22 spores on every diameter.. 21. R. atrides.
- *b*. Spores papillate.
  - 1. Papillae numerous, up to 2 μ high..... 20. R. Tephrosiae.
  - 2. Papillae 2–4 on each spore, 2–5 μ high..... 19. R. stictica.
  - 3. Papillae 4–8 on each spore, 4–7 μ high..... 18. R. Indigoferae.

Section I.—HAPLORAVENELIA.

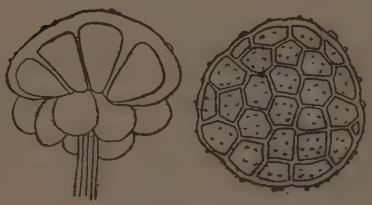
Species living on **Leguminosae.**

Acacia Willd.

1. **Ravenelia escharoides** Syd.

in Ann. Myc. X, 1912, p. 440; Monogr. Ured. III, p. 241.

II. Uredo-sori epiphyllous, sub-epidermal, arranged concentrically in groups, 1–3 mm. diam., minute, barely 0·5 mm. diam., pulverulent, pale rusty-brown, surrounded by the torn epidermis. Uredospores ellipsoid or ovate, briefly echinulate or echinulate-verruculose, pale yellow-brown, 17–22 × 14–17 μ; epispore 1·5 μ thick, with numerous scattered germ pores. Paraphyses none.



Ravenelia escharoides.
Teleutospore heads.

III. Teleuto-sori scattered, minute, black. teleutospore heads slightly convex, circular or sub-circular, 55–90 μ diam., with 6–8 spores on every diameter, yellow-brown, each spore with 4–9 verruciform papillae 1–2 μ high. Single spores continuous, 30–35 μ long, 16–20 μ broad, epispore up to 6 μ thick at the apex Cystidia equal in number to the marginal spores, swelling in water. Pedicel short, hyaline, composite, deciduous.

Host: Acacia Burkei Bth., Potgietersrust, Transvaal, 10.4.08, Burtt-Davy [534]; Springbok Flats, Transvaal, 9.5.17, Pole Evans [10086]; Mosdene, Naboomspruit, 6.10.23, Galpin [20654].

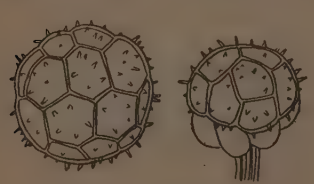
Distribution: Transvaal.

2. **Ravenelia Evansii** Syd.

in Ann. Myc. X, 1912, p. 440; Monograph Ured. III, p. 234.

O. Spermogones amphigenous and ramicolous, scattered, black, minute.

I. Aecidia amphigenous and ramicolous, causing distortion and fasciation of the young shoots, the branches, petioles and leaflets being swollen and malformed; aecidia evenly clothing the whole of the affected shoots, pale yellow, cylindrical, up to 2 mm. long and 400–500 μ diam.; margin of the peridium white, remaining closed for a long time, finally open, somewhat reflexed, incised. Cells of the peridium firmly joined together, irregular, sub-rhomboid to polygonal, 30–50 × 16–30 μ, outer wall striate 13–15 μ thick, inner wall verruculose 4–5 μ thick. Spores sub-hyaline, angular, sub-globose, ovate or ellipsoid, 23–40 × 16–26 μ; epispore very delicately verruculose, 3–4 μ thick.



Ravenelia Evansii.
Teleutospore heads.

III. Teleuto-sori epiphyllous, scattered, sub-epidermal, minute, brown or dark brown. Teleutospore heads slightly convex, round or irregular, 50–80 μ diam., with 4–5 spores on every diameter, yellow-brown to light chestnut-brown; each spore with 4–8 aculeae, which are sub-hyaline, acute, 4–6 μ long, and easily become detached. Single spores continuous, often angular, 25–30 × 17–23 μ, epispore 4–6 μ thick at the apex. Cystidia equal in number to the marginal spores, swelling in water. Pedicel composite, deciduous.

Hosts: Acacia robusta Burch., I, The Willows, near Pretoria, 12.11.04 [149]; The Willows, Pretoria District, 23.3.12 and 23.11.12, Pole Evans [5175, 6588, 6698, 4144]; Loskop, Pretoria District, 18.12.13, Pienaar [18085]; III, The Willows, Pretoria District, 18.5.06, 23.3.12 and 6.3.12, Pole Evans [1231, 2181, 2211]; near Magalies River, Pretoria District, 29.3.11 [1316]; Verulam, Natal, 3.7.13, Pole Evans [6807 and 7105].

Acacia Woodii Burtt-Davy, Estcourt, Natal, 31.7.12, Pole Evans [2539].

Acacia spp., Cramond, Natal, 3.6.12, Pole Evans [2403]; Pretoria, 1917, Bottomley [11670].

Distribution: Transvaal and Natal.

The aecidium has not been previously described.

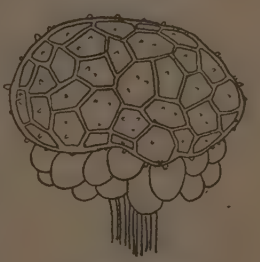
3. Ravenelia inornata Diet.

in Hedwigia XXXIII, 1894, pp. 52–61; Syd. Monogr. Ured. III, p. 244.

Syn. *Aecidium inornatum* Kalch., in Grevillea XI, 1882, p. 25.

I. Aecidia hypophyllous, more rarely an odd one is epiphyllous or petiolicolous, scattered, solitary or in small open groups, briefly cylindrical, white; margin of the peridium irregularly incised or almost entire. Aecidiospores angular, globose to oblong, yellow, 24–34 × 16–24 μ, epispore delicately verruculose, slightly thickened at the apex (up to 6 μ), germ pores not evident.

III. Teleuto-sori mixed with the aecidia, usually hypophyllous, scattered or in small groups, sub-epidermal, very minute, black, surrounded by the torn epidermis. Teleutospore heads convex, slightly concave below, round, 115–175 μ diam., chestnut-brown with 8–12 spores on every diameter; each spore with 1–3 minute verruciform papillae. Single spores continuous up to 60 μ long, 12–18 μ broad, epispore up to 10 μ thick at the apex. Cystidia numerous, pendulous, equal in number to the single spores, ovate. Pedicel short, composed of numerous hyphae.



Ravenelia inornata. Teleutospore head.

Host: Acacia horrida Willd., Somerset East, Cape Province, January, 1881, MacOwan [4262, 2377]; Kentani, Cape Province, 3.6.12, and 23.7.12, Pegler [2368, 2541].

Distribution: Eastern part of Cape Province.

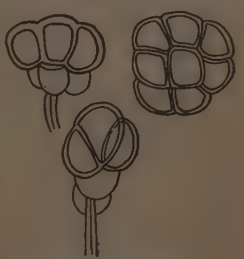
4. Ravenelia natalensis Syd. et Evans.

in Ann. Myc. X, 1912, p. 439; Monogr. Ured. III, p. 245.

I. Aecidia ramicolous, forming tumours 1–2 cm. diam. on the younger branches, and closely covering the surface of the tumour, briefly cylindrical, yellow or yellow-brown; margin of the peridium denticulate. Aecidiospores sub-globose or ellipsoid, 24–30 × 18–22 μ, epispore about 3 μ thick, closely and minutely verruculose.

II. Uredo-sori ramicolous, sub-epidermal, closely crowded and confluent, rusty brown, covering widely extended crustaceous areas on the branches. Uredospores ovate or ellipsoid, yellow to brown, 20–29 × 17–22 μ, epispore 3–3.5 μ thick, remotely aculeate and with four equatorial germ pores. Paraphyses none.

III. Teleuto-sori similar to the uredo-sori, dark brown. Teleutospore heads hemispherical, round to irregular, 30–50 μ diam., chestnut-brown, smooth, composed of 3–12 spores. Single spores obliquely cuneate, continuous, 20–27 × 13–17 μ,



Ravenelia natalensis. Teleutospore heads.

epispore up to 6 μ thick at the apex. Cystidia varying in number, often the same number as the single spores, pendulous, rather large, globose. Pedicel persistent up to 110 μ long 10 μ thick, composed of 1–3 hyphae.

Host: Acacia hirtella E. Mey., Winkle Spruit, Natal, III, 2.7.11 and I, 29.11.11, Pole Evans [1584 and 1935]; Winkle Spruit, 6.7.12, Doidge [2514].

Distribution: Natal.

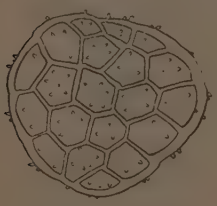
5. **Ravenelia Peglerae** n. sp.

III. Teleuto-sori amphigenous and on the rachis and legumes, very minute, 0·3–0·5 mm. diam., scattered or in small groups and becoming confluent, sub-epidermal, dark brown, surrounded by the torn epidermis. Teleutospore heads slightly convex, round, broadly oval or irregular in outline, 60–110 μ diam., chestnut-brown, smooth and with 6–8 spores on every diameter. Single spores continuous, cuneate, 27–40 μ long and 10–15 μ broad, epispore 6–7 μ thick at the apex. Cystidia equal in number to the individual spores, swelling in water. Pedicel short, hyaline, composite, deciduous.

Host: Acacia eriadenia Bth., on leaves and legumes, Kentani, Cape Province, 21.5.12, 3.6.12, and 20.6.12, Pegler [2331, 2367, 5179, and 5626]; Butterworth, Transkei, 23.6.12, Pegler [2544].

6. **Ravenelia Pienaarii** n. sp.

II. Uredospores mixed with the teleutospores, light brown, ellipsoid or sub-globose, 20–25 × 15–19 μ; epispore light brown, about 1·5 μ thick, briefly and rather sparsely aculeate, and with 6 equatorial germ pores.



Ravenelia Pienaarii. Teleutospore head.

III. Teleuto-sori amphigenous and petiolicolous, chiefly on the lower part of the leaflets and on the secondary rachis, also on the legumes, minute, dark brown, scattered, frequently becoming confluent and crustaceous, sub-cuticular, surrounded by the torn cuticle. Teleutospore heads slightly convex, circular or sub-circular, more rarely irregular, 80–120 μ diam., chestnut-brown, with 7–10 (rarely 6) spores on every diameter. single spores continuous, cuneate, 25–30 × 10–15 μ, epispore up to 7 μ thick at the apex; each spore with a varying number of very minute, light brown warts, 1–1·5 μ high, or rarely up to 2 μ high. Cystidia equal in number to the marginal spores, swelling in water. Pedicel composite, deciduous.

Host: Acacia caffra, Willd., Garstfontein, Pretoria District, April, 1912, and 14.5.13, Pienaar [5627, 6658]; Baviaans Poort, Pretoria District, 25.6.12, Pole Evans [2449]; Pretoria, 27.4.17, Bottomley [11508].

Distribution: Transvaal.

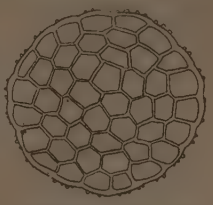
Differs from R. escharoides in habit and in the number of spores in the teleutospore heads.

7. **Ravenelia pretoriensis** Syd.

in Ann. Myc. X, 1912, p. 441; Monogr. Ured. III, p. 241.

II. Uredo-sori amphigenous, sub-epidermal, scattered, minute, barely 0·5 mm. diam., surrounded by the torn epidermis, rusty brown, uredospores ellipsoid, pale yellow or pale yellow-brown, 15–21 × 14–17 μ, epispore 1·5 μ thick, closely echinulate-verruculose and with 6–8 scattered germ pores. Paraphyses numerous, slender, clavate or capitate, 20–35 μ long, 8–11 μ diam. at the apex and with a strongly thickened wall, yellow or pale yellow-brown.

III. Teleuto-sori similar in form and size, black. Teleutospore heads slightly convex, round or nearly so, 60–105 μ diam., yellow-brown, with 4–6 spores on every diameter; each spore having 3–7 minute, verruciform papillae, which are 2 μ long or rarely up to 4 μ long. Single spores continuous, up to 40 μ long and 24 μ broad, epispore 5–9 μ thick at the apex. Cystidia of the same number as the marginal spores, swelling in water. Pedicel short, hyaline.



Ravenelia pretoriensis. Teleutospore head.

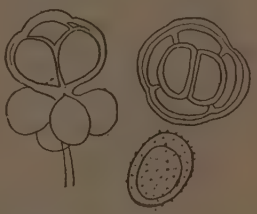
Host: Acacia horrida Willd., Garstfontein, Pretoria District, 11.4.11, Doidge [1376].

Albizzia Durazz.

8. **Ravenelia Bottomleyae** n. sp.

II. Uredospores mixed with the teleutospores, light golden-brown, paler near the apex, sub-globose to ellipsoid, 30–42 × 25–27 μ; epispore golden-brown, 2·5–3·5 μ thick, rather strongly thickened at the apex (up to 10 μ), rather sparsely verruculose-echinulate, and with 2 equatorial germ spores.

III. Teleuto-sori amphigenous, but mostly epiphyllous, sub-epidermal, black, up to 1 mm. diam., round to irregular, surrounded by the torn epidermis, scattered or in groups, with a tendency to develop in centrifugal circles, often becoming confluent and covering the greater part of the leaf surface with a black, crustaceous mass. Teleutospore heads hemispherical, circular or broadly oval in outline, dark chestnut brown, smooth, 40–60 μ diam., usually composed of 2 inner and 4 marginal spores, more rarely of 3 inner and 6 marginal spores, or even 1 inner and 2 marginal spores. Single spores continuous, broadly cuneate, 27–30 μ long and 23–33 μ broad, epispore 6–7 μ thick at the apex. Cystidia equal in number to the marginal spores, pendulous, globose, swelling in water. Pedicel hyaline, rather long, deciduous.



Ravenelia Bottomleyae. Teleutospore heads and one uredospore.

Host: Albizzia versicolor Welw., Kandahar, Victoria Falls, Rhodesia, 20.7.20, Bottomley [14166].

9. **Ravenelia minima** Cke.

in Grevillea X, 1882, p. 128; Syd. Monogr. Ured. III, p. 247.

II. Uredo-sori hypophyllous, scattered or in small irregular groups, on small leaf-spots up to 1 mm. diam., which show yellowish on the upper surface, very minute, up to 0·3 mm. diam., surrounded by the torn epidermis. Uredospores ovate or sub-clavate, rarely ellipsoid or sub-globose, very pale brown, 23–30 × 15–23 μ, epispore 2·5–3 μ thick, often slightly thickened at the apex (up to 7 μ), sparsely and evenly covered with obtuse aculeae, and with 4 equatorial germ pores.

III. Teleuto-sori hypophyllous, sub-epidermal, scattered or more or less grouped, very minute, surrounded by the torn epidermis, brown. Teleutospore heads hemispherical, round, 50–65 μ diam, light chestnut-brown, mostly composed of 3 internal and 6 marginal spores; each spore with 4–7 hyaline papillae up to 8 μ long and obtuse at the apex. Single spores continuous, about 25 μ long and broad, epispore 3–4 μ thick at the apex. Cystidia globose, minute, equal in number to the single spores. Pedicel not seen.

Ravenelia minima. Teleutospore heads.

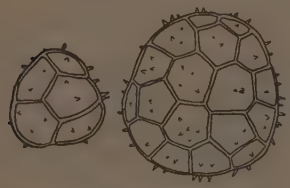
Host: Albizzia fastigiata Oliv., Inanda, Natal, May 1881, Medley Wood [10697]; Winkle Spruit, Natal, 13.4.11, 2.7.11 and 5.6.12, Pole Evans [1400, 1582, 2384]; Scottsburgh, Natal, 5.7.13, Pole Evans [6827].

Distribution: Natal.

Dichrostachys Wight et Arn.

10. **Ravenelia Dichrostachydis** n. sp.

III. Teleuto-sori amphigenous, but mostly on the rachis and petiole, dark brown, minute, scattered or in small groups or becoming confluent, sub-epidermal. Teleutospore heads hemispherical, circular, oval or irregular in outline 50–80 μ diam., dull brown, with 3–4, rarely 5 spores on every diameter. Single spores continuous, cuneate, 30–37 × 16–19 μ, epispore 5–6 μ thick at the apex; each spore with 4–12 blunt, hyaline or light brown papillae, up to 5 μ long. Cystidia equal in number to the individual spores, swelling in water. Pedicel hyaline, deciduous. Paraphyses extremely numerous, light brown, capitate to clavate, up to 60 μ long, 15–22 μ broad at the apex, wall thickened at the apex up to 7 μ.



Ravenelia Dichrostachydis. Teleutospore heads.

Host: Dichrostachys nutans Bth., Verulam, Natal, 3.7.13, Pole Evans [6806, 7106].

Cassia L.

11. **Ravenelia Baumiana** P. Henn.

in H. Baum. Botan. Ergebnisse der Kunene-Zambesi-Exped., 1902, p. 157; Syd. Monogr. Ured. III, p. 262.

II. Uredo-sori amphigenous, usually epiphyllous, scattered or in small groups, 2–3 mm. diam., minute, 0·3–0·5 mm. diam., soon becoming naked, pulverulent, surrounded by the torn cuticle, yellow brown. Uredospores sub-globose, ellipsoid or ovate, yellow-brown, briefly echinulate-verruculose, 16–22 × 11–16 μ, epispore 2 μ thick, with 6–8 scattered germ pores. Paraphyses none.

Ravenelia Baumiana. Teleutospore head.

III. Teleuto-sori similar, dark brown. Teleutospore heads convex, circular, chestnut-brown, 65–120 μ diam., with 5–10 spores on every diameter; each spore with a single, obtuse, cylindrical appendage, which is often swollen or even lobed at the apex, 5–12 μ long and 3–5 μ thick. Single spores continuous, 30–38 × 13–18 μ, cuneate or prismatic, epispore 6–7 μ thick at the apex. Cystidia ovate, equal in number to the single spores, diffusing in water. Pedicel short, composite, deciduous.

Host: Cassia goratensis Fres. Humbe, 5.6.00, Baum [6886].

12. **Ravenelia Le Testui** Maublanc.

in Bull. Soc. Myc. France XXII, 1906, p. 72; Syd. Monogr. Ured. III, p. 267.

II. Uredo-sori amphigenous, not on leaf-spots, sub-cuticular, scattered or becoming irregularly grouped, minute, round or irregular, 0·3–0·5 mm. diam., soon becoming naked, pulverulent, surrounded by the torn cuticle, cinnamon-brown. Uredospores sub-globose, ellipsoid or ovate, yellow-brown, 17–22 × 11–17 μ, epispore 1–1·5 μ thick, delicately echinulate and with 6–8 scattered germ pores. Paraphyses very scanty, sub-hyaline, clavate, more rarely sub-capitate, up to 55 μ long.

III. Teleuto-sori amphigenous and caulicolous, sub-cuticular, more or less thickly scattered over the whole leaf surface, minute or of medium size, 0·5–2 mm. diam., on the stems often elongated and up to 1 cm. long, surrounded by the torn cuticle, black. Teleutospore heads hemispherical, round or irregular, dark chestnut-brown, 65–115 μ diam., with 6–9 spores on every diameter. Each spore with a single hyaline verruciform papilla 1–2 μ high, often scarcely visible. Single spores continuous, 28–35 μ long, 14–20 μ broad, epispore 6–8 μ thick at the apex. Cystidia globose, equal in number to the single spores, pendulous, readily diffusing in water. Pedicel short, hyaline, deciduous composed of numerous hyphae.

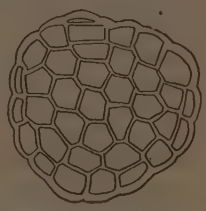
Host: Cassia sp, Marral, Portuguese East Africa.

This species is not represented in the National Herbarium; the description is taken from Sydow (*loc. cit.*).

Elephantorhiza Benth.

13. **Ravenelia Elephantorhizae** n. sp.

II. Uredo-sori amphigenous and petiolicolous, sub-epidermal, minute, 0·3–0·5 mm. diam., round, elongated or irregular, scattered or rather crowded in irregular groups and becoming confluent, cinnamon-brown, pulverulent, surrounded by the torn epidermis. Uredospores very pale brown, ellipsoid to ovate, more rarely sub-globose, 20–25 × 13–17 μ; epispore about 1·5 μ thick, light brown, briefly and rather remotely echinulate, germ pores numerous (8–12), scattered. Paraphyses not numerous, clavate, light brown.



Ravenelia Elephantorhizae. Teleutospore head.

III. Teleuto-sori similar to the uredo-sori, but darker brown and larger, up to 1·5 mm. long. Teleutospore heads slightly convex, round to irregular in outline, very variable in form and size, 50–105 μ diam., golden-brown, with 4–9 spores on every diameter, smooth. Single cells continuous, cuneate, 30–40 μ high and 10–14 μ broad; epispore 6–8·5 μ thick at the apex. Cystidia rather large, globose, pendulous, equal in number to the individual spores, swelling in water. Pedicel hyaline, short, deciduous, composite.

Host: Elephantorhiza Burchelliae Bth., Koedoespoort, Pretoria District, 12.4.15, Pole Evans [8955]; Buffelshoek, 3.3.19, Pole Evans [12225]; Kaalfontein, Pretoria District, 20.1.20 [12841].

Distribution: Transvaal.

Leguminosae, spec. undet.

14. **Ravenelia Woodii** Pazschke.

in Hedwigia XXXIII, 1894, pp. 48 and 67; Syd. Monogr. Ured. III, p. 290.

II. Uredo-sori usually hypophyllous, sub-epidermal, on yellow or brownish leaf-spots, which are often concave, minute, light cinnamon-brown. Uredospores globose to broadly ellipsoid, pale, epispore briefly echinulate. Paraphyses very numerous, closely crowded, clavate, brown, 10–12 μ thick at the apex.

III. Teleuto-sori similar to the uredo-sori. Teleutospore heads slightly convex, irregularly round or elliptical, dark brown, 115–140 μ diam., with a few solitary verrucae near the margin, usually with 6 spores on every diameter. Single spores continuous, usually 17–21 μ broad, rarely up to 32 μ. Cystidia oriented from the margin towards the centre of the head. Pedicel short, composite.

Host: Leguminosae undet., Medley Wood, Natal.

This species is missing from Wood's collection in the National Hebrarium. The description is taken from the original.

Section II. PLEORAVENELIA.

Species living on the **Leguminosae.**

Acacia Willd.

15. **Ravenelia deformans** (Maubl.) Diet.

in Beihefte Botan. Centralblatt XX, 1906, Abt. II, p. 404; Syd. Monogr. Ured. Ured. III, p. 296.

Syn. *Pleoravenelia deformans* Maublanc. in Bull. Soc. Mycol., France XXII, 1906, p. 73.

O. Spermogones sub-cuticular, flattened, 50–90 μ diam.

I. Aecidia ramicolous, causing malformation of the younger branches, usually more or less closely crowded, long remaining closed, later cupulate. Aecidiospores globose, angular-globose or ellipsoid, yellow, 18–28 × 18–23 μ; epispore 2·5–3 μ thick, closely and minutely verruculose and with numerous scattered germ pores.

III. Teleuto-sori ramicolous, with the same distribution as the aecidia, and often developing between them, minute, dark brown. Teleutospore heads very variable in form and size, chestnut-brown, 60–120 μ diam., smooth, with 5–8 spores on every diameter; single spores two-celled, with the septum oblique, rarely horizontal, cuneate, 38–52 μ long, 16–28 μ broad, epispore up to 10 μ thick at the apex. Cystidia equal in number to the marginal spores, appressed to the capitulum, diffusing in water. Pedicel hyaline, deciduous.

Host: Acacia sp. (probably A. arabica), Mhalume, Portuguese East Africa.
Not represented in the National Herbarium.

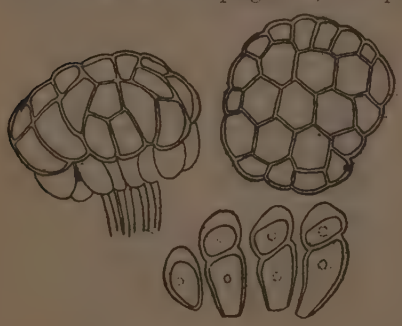
16. **Ravenelia MacOwaniana** Pazschke.

in Hedwigia XXXIII, 1894, pp. 30 and 59; Syd. Monogr. Ured. III, p. 294.

Syn. *Aecidium ornamentale* Kalch. in Flora, 1876, p. 362.
Ravenelia ornamentalis Diet. in Beihefte Bot. Centralbl. XX, 1906, Abt. II, p. 402.

I. Aecidia on the branches, inflorescences and fruits, clothing considerable areas on the younger branches and always causing malformations, cylindrical, about 1 mm. long, 250 μ diam., yellow or yellow-brown; margin of the peridium denticulate. Aecidiospores globose, ellipsoid or oblong, often angular, yellow, 24–35 × 17–28 μ, epispore about 3 μ thick, densely verruculose and with numerous scattered germ pores.

II. Uredo-sori amphigenous, sub-epidermal, round, 0·5–1 μ diam., brown. Uredospores ovate or pyriform, more rarely oblong, yellow-brown, often darker at the apex, 25–35 × 18–24 μ; epispore 2–3 μ thick, echinulate, and with 4 equatorial germ pores. Paraphyses numerous, capitate and yellow-brown at the apex.



Ravenelia MacOwaniana.
Teleutospore heads and single teleutospores.

III. Teleuto-sori similar to the uredosori, dark brown. Teleutospore heads slightly convex, very variable in form and size, rarely completely circular, often angular, 60–130 μ diam., yellow-brown, smooth, with 4–7 spores on every diameter. Single spores (except the marginal ones) two-cellular, with the septum oblique, up to 45 μ long, inner spores 18–28 μ broad, marginal spores narrower. Cystidia equal in number to the marginal spores, diffusing in water. Pedicel deciduous, formed of hyphae not or loosely connected.

Host: Acacia horrida Willd. I, Boschberg Mountains, near Somerset East, November, 1875, MacOwan 1044 [2376 and 4067]; Ladysmith, Natal, February, 1895, Medley Wood [329, 834, 10299 and 13074]; Leeuwdoorn, Carolina District, 20.7.10, Burtt-Davy [929]; Wonderboom, Pretoria District, 11.3.11, Pole Evans [1251]; Kentani, Cape Province, 30.10.11 and 4.11.14, Pegler [1915 and 8757]; The Thorns, Pretoria District, 3.1.12 and 2.3.12, Pole Evans [1985 and 2170]; Hennops River, Pretoria District, 29.1.12, Doidge [2123]; Plat River, Pretoria District, 29.1.12, Pienaar [2135]; Bathurst, Cape Province, 18.5.12, Pienaar [2552]; Vryburg, 27.4.12, Burtt Davy [5154]; Garstfontein, Pretoria District, 5.6.13, Pienaar [6665]; Butterworth, Transkei, 16.1.14, Pegler [7367]; Onderstepoort, Pretoria District, 21.2.14; Pole Evans [7404]; Muden, Natal, 1.4.14, Doidge [8245]; Queenstown, 25.2.15, Holley [8857]; Riverton, near Kimberley, 3.3.17, Moran [10017]; Springbok Flats, Transvaal, 19.11.17, Pole Evans [11002]; Bloemfontein, November 1916, Potts [11300]; Horn's Nek, Pretoria District, January, 1919, Pole Evans [11857]; near Klipplaat, Cape Province, 11.2.22, Schonland [15453]; II and III, Wonderboom, Pretoria District, 11.3.11, Pole Evans, [1245]; Kroonstad, Orange Free State, 1.3.11, Van der Merwe [1471]; The Thorns, Pretoria District, 24.5.11, Doidge [1524]; Indwe, Cape Province, 23.2.12, Pienaar [2077]; The Thorns, Pretoria District, 2.3.12, Pole Evans [2095]; Fountains, Pretoria District, 27.4.12, Van der Bijl [2255]; Zwartfontein, near Takoon, Bechuanaland, 6.5.12, Burtt-Davy [2355]; Vryburg, 27.4.12, Burtt-Davy [2357]; Trapps Valley, Bathurst District, 19.5.12, Pienaar [2423]; Baviaan's Kloof, Pretoria District, 25.6.12, Pole Evans [2447]; Garstfontein, Pretoria District, 5.6.13, Pienaar [6665].

Distribution: South and Central Africa.

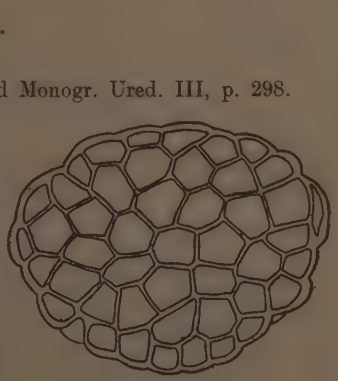
Calpurnia E. Mey.

17. **Ravenelia glabra** Kalch et Cke.

in Jour. Roy. Micr. Soc. III, 1880, p. 386; Syd Monogr. Ured. III, p. 298.

II. Uredo-sori hypophyllous, on small yellow leaf-spots, sub-epidermal, scattered, minute, 0·3–1 mm. diam., surrounded by the torn epidermis, light cinnamon brown. Uredospores oblong-ovate to sub-fusiform, yellow- brown, 32–48 × 14–21 μ, epispore 3 μ thick, sparsely echinulate and with 4 equatorial germ pores. Paraphyses none.

III. Teleuto-sori similar to the uredo-sori; dark brown. Teleutospore heads rather flat, round to irregular in outline, chestnut-brown, smooth, 120–160 μ diam., with 6–9 spores on every diameter. Single spores two-celled, up to 40 μ long, 15–26 μ broad, epispore up to 5 μ thick at the apex. Cystidia equal in number to the single spores, decurrent towards the pedicel. Pedicel rather long, but deciduous, hyaline, composite 20–30 μ thick.



Ravenelia glabra.
Teleutospore head.

Host: Calpurnia sylvatica E. Mey., near Somerset East, Cape Province, June 1880, MacOwan [2375, 10696, 10698]; Kentani, Cape Province, 1.5.12, 24.5.12, and 7.7.12, Pegler [2320, 2330, 5165].

Distribution: Eastern part of Cape Province.

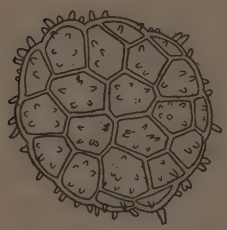
Indigofera L.

18. **Ravenelia Indigoferae** Transzch.

in Hedwigia XXXIII, 1894, p. 369; Syd. Monogr. Ured. III, p. 300.

Syn. *Pleoravenelia Indigoferae* Long in Bot. Gazette XXXV, 1903, p. 129.
Uredo anilis P. Henn. in Hedwiga XXXVIII, 1899, Beiblatt, p. (68).

II. Uredo-sori amphigenous or petiolicolous, sub-epidermal, irregularly distributed, minute, 0·5–1 mm. diam., cinnamon-brown. Uredospores globose, sub-globose, ovate or broadly ellipsoid, light brown, 20–29 × 17–23 μ, epispore 1·5–2 μ thick, briefly and remotely echinulate and with 8–12 scattered germ pores. Paraphyses very numerous, clavate-spathulate or capitate, 80–100 μ long, 20–30 μ broad, brown at the apex, sub-hyaline below.



Ravenelia Indigoferae. Teleutospore head.

III. Teleuto-sori on the leaves amphigenous, sub-epidermal, scattered or becoming crowded, minute, 0·5–1 mm. diam.; on the stems causing thickening, closely crowded and forming groups of sori up to 3 cm. long, dark brown. Teleutospore heads, slightly convex, circular, 75–125 μ diam., chestnut-brown, with 4–6 spores on every diameter; each spore with 4–8 erect, light brown papillae, 4–7 μ long and 2–3 μ broad. Single spores two-celled, 40–48 μ long, 20–30 μ broad; epispore about 5 μ thick at the apex. Cystidia rather large, of the same number as the single spores. Pedicel short, hyaline, deciduous, composite.

Host: Indigofera sp., Salisbury, May, 1920, Eyles [15513].

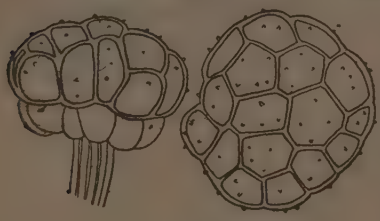
Distribution: Ravenelia Indigoferae is an American species and has not been recorded from the Old World, but I can find no morphological difference between the Rhodesian specimen and the material described from Mexico, Cuba, Jamaica, Bermuda and Brazil. The Rhodesian material, which is not very plentiful, is therefore assigned provisionally to this species.

Mundulea D.C.

19. **Ravenelia stictica** Berk et Br.

in Journ. Linn. Soc. Bot. XIV, 1875, p. 93; Syd. Monogr. Ured. III, p. 302.
Syn. *Ravenelia Munduleae* P. Henn. in Ann. del R. Ist. de Roma VI, Fasc. 2, 1896, p. 86.

II. Uredo-sori amphigenous, mostly hypophyllous, sub-epidermal, scattered, minute, light cinnamon-brown, surrounded by the torn epidermis. Uredospores ovoid, ellipsoid or oblong, yellow to yellow-brown, 21–33 × 17–24 μ, epispore up to 2·5 μ thick, sparsely and minutely echinulate and with 4 equatorial germ pores. Paraphyses none.



Ravenelia stictica. Teleutospore heads.

III. Teleuto-sori amphigenous, scattered or in small irregular groups, minute, often becoming confluent, dark brown, surrounded by the torn epidermis. Teleutospore heads somewhat convex, circular or irregular in outline, yellow-brown to chestnut-brown, 65–110 μ diam, with 4–5 spores on every diameter; each spore with 2–4 obtuse brown papillae, 2–5 μ long. Single spores bicellular, 32–40 μ long, 18–28 μ broad; epispore about 5 μ thick at the apex. Cystidia equal in number to the single spores, joined, marginal, diffusing in water. Pedicel short, hyaline.

Host: Mundulea suberosa DC., The Willows, Pretoria District, 18.5.06 [124]; Hartebeestpoort, Pretoria District, 24.5.03, Burtt Davy [146]; The Thorns, Pretoria District, 24.5.11, Doidge [1522]; The Willows, 6.4.12 and 20.4.12, Pole Evans [2210, 2256]; Silverton, Pretoria District, Van der Bijl [2227]; Zilikats Nek, Pretoria District, 10.4.20, Doidge [13089]; Meintjes Kop, Pretoria, 21.7.24, Gower [19842].

Distribution: South and Central Africa, East India and Ceylon. The genus Mundulea occurs also in Madagascar; apart from this island, the fungus is known in all countries where the host occurs.

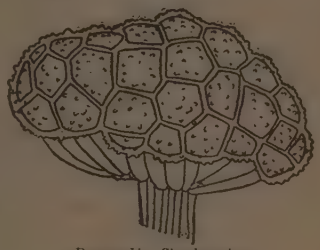
Tephrosia Pers.

20. **Ravenelia Tephrosiae** Kalch.

Apud Parker in Proceed. Amer. Acad. of Arts and Sc. XXII, New Ser. XIV, Part I, Boston, 1886, p. 217; Syd. Monogr. Ured. III, p. 304.

II. Uredo-sori amphigenous, sub-epidermal, scattered or irregularly grouped, very minute, about 0·25 mm. diam., cinnamon brown, surrounded by the torn epidermis. Uredospores sub-globose or ovate, yellow-brown, 24–30 × 20–25 μ, epispore 1·5 μ thick, briefly echinulate and with 8 equatorial germ pores.

III. Teleuto sori, similar to the uredo-sori, dark brown. Teleutospore heads hemispherical, usually circular in outline, light chestnut-brown, 80–150 μ diam., with 6–8 spores on every diameter, the whole surface being rather closely and irregularly set with brown verruciform papillae up to 2 μ high. Single spores two-celled, 18–30 μ broad. Cystidia equal in number to the single cells, bladderlike, connate, persistent. Pedicel hyaline, thick, short, composed of numerous hyphae.



Ravenelia Tephrosiae.
Teleutospore head.

Host: Tephrosia macropoda E. Mey., Inanda, Natal, Medley Wood [10700]; Entumeni, Zululand, June, 1916, Haygarth [14190].

Distribution: Natal and Zululand.

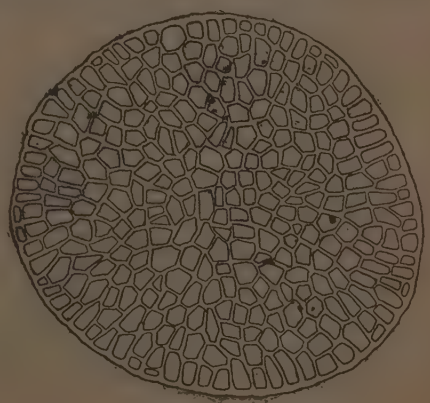
Species living on **Tiliaceae.**

21. **Ravenelia atrides Syd.**

in Ann. Myc. X, 1912, p. 438; Monogr. Ured. III, p. 307.

II. Uredo-sori hypophyllous, not on leaf-spots, irregularly distributed or grouped, sub-epidermal, minute, pale rusty brown. Uredospores ellipsoid or ovate, yellow or pale yellow-brown, 16–20 × 12–14 μ; epispore 1·5 μ thick, briefly and delicately echinulate. Paraphyses extremely numerous, cylindrical-clavate or clavate, straight or often more or less incurved, thin walled throughout, light brown, 30–50 μ long, 10–13 μ broad.

III. Teleuto-sori similar to the uredo-sori, black. Teleutospore heads convex, round or ellipsoid in outline, dark and dull brown, opaque, smooth, 110–190 μ diam., with 15–22 spores on every diameter. Single spores, the inner ones bicellular, 35–45 μ long, 14–19 μ wide; epispore 4–10 μ thick at the apex and almost black. Cystidia equal in number to the single cells, globose, minute. Pedicel short.



Ravenelia atrides.
Teleutospore head.

Host: Grewia caffra Meisn., Bluff, Durban, 7.7.11, Doidge [1630]; same locality, 7.7.11 and 7.12.11, Pole Evans, [1670, 2534].

Grewia occidentalis L., Amanzimtoti, Natal, 10.7.11, Doidge, [1629].

Distribution.

KUEHNEOLA P. Magn.

in Botan. Centralblatt LXXIV 1988, p. 169.

O. Spermogones epiphyllous, sub-cuticular, flat, yellow or yellow-brown.

I. Aecidia none.

II. Uredo-sori when present, minute, without peridium, orange-yellow, with or without paraphyses. Uredospores globose to ellipsoid, solitary at the tip of a pedicel or sessile, germ pores several, indistinct.

III. Teleuto-sori minute, rather compact and waxy, brown to whitish. Teleutospores unicellular, smooth, hyaline or coloured, firmly connected in chains of varying length, often not falling apart; each with a single germ pore, germinating as soon as mature. Promycelium typical, 4-celled. Sporidia globulose.

South African species, two.

1. **Kuehneola albida** (Kuehn.) P. Magn.

in Botan. Centralbl. LXXIV, 1898, p. 169. Syd. Monogr. Ured. III, p. 315.

Syn. *Chrysomyxa albida* Kuehn. in Bot. Centralb. XVI, p. 154 (1883).
Phragmidium albidum Lagh. in Mitteil. d. Badisch. Bot. Ver., p. 44 (1888).
Phr. albidum Ludw. in Centralbl. f. Bakt. III, p. 762 (1887).

O. Spermogonia epiphyllous, in minute round groups, flattened-hemispherical or lenticular, 150–200 μ diam., up to 100 μ high.

I. Primary uredo-sori epiphyllous, more rarely hypophyllous, usually forming a circle round the spermogonia or becoming confluent in a ring, on yellow or orange-coloured spots, 0·5–1 mm. diam., soon becoming naked, surrounded by the torn epidermis, orange-yellow, without paraphyses. Primary uredospores globose, sub-globose, ellipsoid or ovate, orange, 18–29 × 16–23 μ; epispore 1–2 μ thick, sparsely and delicately echinulate-verruculose.

Secondary uredo-sori hypophyllous, very rarely epiphyllous, sometimes also caulicolous, densely and equally scattered or grouped, often covering the entire leaf surface, about 1 mm. diam., pale lemon-yellow, then white, no paraphyses. Secondary uredospores globose, sub-globose or ellipsoid, yellow, 18–28 × 16–23 μ; epispore 1–1·5 μ thick, sparsely and delicately echinulate, verruculose, and with 3–4 rather inconspicuous, equatorial germ pores.

Kuehneola albida.
Teleutospores.

III. Teleuto-sori hypophyllous, scattered or in groups, but not confluent, minute, 0·1–0·5 mm. diam., soon becoming naked, pulvinate, yellow or white. Teleutospores in chains of 2–12, usually 5–7, which are clavate or elongated and cuneate, straight or slightly curved, 40–120 μ long; spores rounded or sub-truncate at the apex or sometimes lobed, obtusely cuneate or ovate-ellipsoid, unequal, 17–30 μ long, 17–24 μ broad, the lower spores always cuneate and longer, hyaline, germinating immediately; epispore smooth, 1–1·5 μ thick at the base, becoming gradually thicker towards the apex (up to 4 μ); germ pore single, apical; pedicel very short or almost none, hyaline.

Hosts: Rubus fruticosus L., Barberton [642]; Wellington, Cape Province, 31.10.10, Doidge [992]; Knysna Forest, Cape Province, 31.5.12, Pienaar [2417];
Rubus rigidus Sm., Barberton, 29,8,11, Pole Evans [1863].
Rubus vitifolius, Stellenbosch, Cape Province, 15.9.13, Buller [6931].
Rubus sp., Capetown, March, 1909, Lounsbury [681].

Distribution: South Africa, Europe, North America, New Zealand.

2. **Kuehneola Fici** Butl.

in Ann. Myc. XII, 1914, p. 76; Syd. Monogr. Ured III, p. 323.

Syn. *Uredo Fici* Cast. apud. Desm. Plant. Crypt. No. 1662 (1848).
U. fici Cast. var. *abyssinica* P. Henn in Engl. Bot. Jahrb. XVII, p. 15 (1893).
U. ficicola Speg. in Fung. Guaranitici I, in Anal. Soc. Cient. Argent. XVII, p. 120 (1883).
U. Trabutii Pat. in Bull. Soc. Myc. France XVII, p. 187 (1901).
Physopella Fici Arth. in Result, Sc. Congr. Bot. Vienne, p. 388 (1906) and in North American Flora, Uredinales, p. 103.

II. Uredo-sori hypophyllous, often on indeterminate pale or brownish spots irregularly distributed, usually more or less grouped and often covering the greater part of the leaf surface, round, minute, 0·1–0·3 mm. diam., opening by a central pore and becoming pulverulent, cinnamon or rusty-brown. Each sorus surrounded by a ring of paraphyses, which soon disappear, these are erect or incurved, hypha-like, very slender, 60–80 μ long, very thin walled and slightly thickened at the apex. Uredospores ovate-globose or ellipsoid, pale yellow to yellow-brown, 18–28 × 14–20 μ; epispore 1–1·5 μ thick, finely and closely echinulate, and with 2–4 germ pores.

[III. Teleuto-sori hypophyllous, very rare, minute, somewhat waxy, pale. Teleutospores in chains of 2–7 cells, which are loosely united laterally to form a waxy sorus, readily falling apart, especially the upper ones, irregular, angular-globose, ellipsoid or oblong, smooth, sub-hyaline, 15–24 × 10–13 μ; epispore evenly 1–1·5 μ thick].

Hosts: Ficus carica L., Grahamstown, 30.3.07, Dewar [289]; Constantia, Cape, Province, 8.3.09, Pole Evans [615]; Lourenco Marques, 21.2.10 [708]; Maritzburg, Natal March 1910, Doidge [852]; Cape Province, without locality, February 1911, Mally [1207]; Rhenosterfontein, Marico District, March 1911 [1315].

Ficus Pretoriae Burtt Davy, Pretoria, 6.8.04, Burtt Davy [176]; 18.3.11, Pole Evans [1298].

Distribution: South Africa, North Africa, Europe, India, North and South America, Java, Formosa, Phillipines.

This is the common fig rust of which the uredo-stage has been described under various names. The teleuto-stage was found in India by Butler, who found it intermingled with the uredo-sori on Ficus glomerata. The teleuto-stage is rare, and has not been found in South Africa.

SKIERKA Racib.

in Parasitische Algen und Pilze Javas II, 1900, p. 30.

II. Uredo-sori, when present, very minute, without peridium, paraphyses none. Uredospores obovate to subfusiform, aculeate or acutely verrucose, solitary, germ pores indistinct.

III. Teleuto-sori at first minute, round, then long, filiform, slender, white or yellowish, erumpent through the stomata, formed of numerous, loosely connected teleutospores. Teleutospores lanceolate or fusiform, unicellular, hyaline, smooth, attenuate at the apex, thin-walled, germinating to form a slender promycelium which is typically 4–5-celled. Sporidia globose to pyriform, on very short sterigmata.

Of the three species of Skierka described in Sydow's Monograph, two are found in Java and one in tropical Africa in the Congo.

Skierka robusta sp. nov.

III. Teleuto-sori hypophyllous, in small groups on purplish-brown leaf-spots up to 5 mm. in diam., sometimes arranged in circles; at first round, minute, hemispherical (400–500 μ diam.), and covered by the discoloured epidermis, later filiform, very slender,

pale yellow, up to 2·5 mm. long and 100–150 μ thick. Teleutospores hyaline or yellowish, narrow-lanceolate or lanceolate-fusiform, attenuate at the base, acuminate at the apex, and further drawn out into a long filiform process, 120–180 × 20–27 μ; epispore smooth, 3–3·5 μ thick at the sides, or even up to 5 μ, thickened tip and filiform process 60–110 μ long, cavity of the spore cuneate in form with granular contents and conspicuous nucleus.

Skierka robusta.
Teleutospores.

Host: Rhoicissus rhomboidea E. Mey., on leaves, Stella Bush, Durban, 11.7.11, Doidge [1635]; Lemana, Northern Transvaal, 14.8.11, Doidge [1824]; Winkle Spruit, Natal, 5.6.12, Pole Evans [2398]; Umgeni Beach, Durban, 4.6.12, Pole Evans [2416]; Isipingo, Natal, 13.5.13, Doidge [6628].

In his monograph, Sydow mentions three species of Skierka, which all have thin-walled teleutospores; the present species differs in having rather thick walls and a very much thickened apex. The filiform process (which is included in the spore measurements) appears to help in holding the column of spores together by twisting round adjacent spores; it frequently breaks off when the spores are torn apart.

MELAMPSORACEAE.

Teleutospores sessile, compacted laterally into more or less effuse crustiform layers, or with columnar or lenticular bodies, rarely produced singly in the tissues of the host, germinating to form an external pro-mycelium, which is typically 4-celled.

KEY TO THE SOUTH AFRICAN GENERA.

I. Teleuto-sori crustiform or lenticular, sub-cuticular or sub-epidermal, usually covered, more rarely erumpent. Aecidia caeoma-like. Uredospores solitary..... MELAMPSOREAE.
  A. Teleutospores in one layer..... Melampsora.
  B. Teleutospores in several layers..... Schroeteriaster.

II. Teleuto-sori sub-epidermal or inter-cellular, formed of groups or imperfect layers of spores, or spores solitary. Aecidium with a cylindrical peridium. Uredospores solitary or very rarely in short chains. In South African genera teleutospores 2–4-celled, uredo-sori with a peridium, uredospores without germ pores..... PUCCINEASTREAE.
  A. Teleutospores intercellular.
    a. Teleutospores sub-epidermal, coloured..... Pucciniastrum.
    b. Teleutospores usually solitary in the mesophyll, rarely sub-epidermal, hyaline..... Uredinopsis.
  B. Teleutospores intra-cellular, hyaline..... Milesina.

III. Teleuto-sori verruciform, cylindrical or filiform, erumpent. Aecidia with a peridium. Uredospores solitary..... CRONARTIAE.
  A. Teleuto-sori with a peridium.
    a. Sori aecidiiform. Teleutospores unicellular..... Endophyllum.
    b. Sori aecidiiform or briefly cylindrical. Teleutospores 2-celled..... Pucciniosira.
  B. Teleutosori without a peridium. Sori elongated or filiform, spores unicellular, firmly connected Cronartium.

MELAMPSORA Cast.

in Observ. myc. II, 1843, p. 18.

Autoecious or heteroecious.

O. Spermogones not conspicuous, conoid or sub-hemispherical, sub-cuticular, or sub-epidermal.

I. Aecidia round or irregular, orange, without peridia or paraphyses. Aecidiospores catenulate, globose or oblong, often angular, epispore hyaline, verruculose.

II. Uredo-sori usually minute, orange, pulverulent or sub-pulverulent, without peridium. Uredospores abstricted singly, globose or oblong, epispore hyaline, verrucose or briefly aculeate; spores mixed with numerous large, capitate or clavate paraphyses.

III. Teleuto-sori sub-cuticular or sub-epidermal, crustaceous, compacted laterally into firm layers, often confluent, at first pale, later often black, indehiscent, covered. Teleutospores in a single layer, closely compacted laterally, usually prismatic, coloured, smooth, 1-celled, with a single obscure germ pore. Promycelium typical, 4-celled, sporidia globose, pale or yellow.

South African species six, of which three are insufficiently known.

1. **Melampsora aecidioides** Schroet (*sensu lato*),

Sacc. Syll. Fung. VII, p. 590.

II. Uredo-sori hypophyllous, on small yellow leaf-spots, round, sub-pulverulent, 0·5–1 mm. diam. Uredospores sub-globose, ovate or ellipsoid, 17–24 × 15–17 μ. epispore 2·5–3 μ thick, remotely verrucose-aculeate. Paraphyses usually capitate, 46–55 μ long, remotely verrucose-aculeate. Paraphyses usually capitate, 46–66 μ long, 15–23 μ broad at the tips, wall 3–6 μ thick.

Hosts: Populus alba L., Inchanga, Natal, 26.11.08 [733]; Woodbush, Northern Transvaal, 15.12.13, Forest Officer [7102].

Populus spp., Capetown, 21.4.09 [639]; Groot Drakenstein, Cape Province, 25.1.10 [711]; Cape, without locality, Lounsbury [724]; Wellington, Cape Province, 15.5.11, Bottomley [1514].

The poplar rust is only known in the uredo-stage in South Africa, and it is therefore not possible to assign it definitely to any one of the numerous species of Melampsora on Populus. I have therefore followed Dr. Sydow's suggestion, that until the life-history be more fully known this rust be recorded under the name Melampsora aecidioides in the old sense.

2. **Melampsora Helioscopiae** Wint. (*sensu lato*).

Sacc. Syll. Fung. VII, p. 586.

II. Uredo-sori amphigenous or caulicolous, scattered or in circular groups, minute, 0·3–1 mm. diam., yellow. Uredospores globose, sub-globose, or ellipsoid, contents yellow, 16–22 × 14–18 μ, epispore remotely echinulate. Paraphyses capitate, 14–20 μ thick at the apex.

Hosts: Euphorbia kraussiana Bernh., Claridge, Natal, 31.5.15, Doidge [9087].

Euphorbia striata Thun., Mooi River, Natal, 14.4.19, Mogg [17035].

Euphorbia spp., Bethlehem, Orange Free State, 2.1.11, van der Merwe [1065]; Barberton, 29.8.11, Pole Evans [1851].

Only the uredo-stage has been collected on Euphorbia up to the present. This is therefore an interim classification, cfr. M. aecidioides.

3. **Melampsora Hypericorum** Wint.

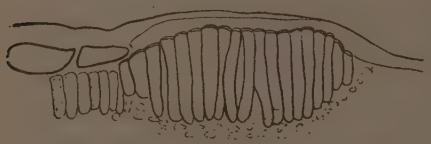
Pilze Deutschl., 1881, p. 241; Syd. Monogr. Ured. III, p. 384.

Syn. *Uredo Hypericorum* D.C., in Rapport sur un Voyage botanique et agronomique dans les Departements de l'Ouest (Mem de la Soc. d'Agric. X, Paris, 1807, p. 235).

U. Androsaemi D.C., Encycl. bot. VIII, p. 230 (1808).
Caeoma Hypericorum Schlecht. Fl. Berol II, p. 122 (1824).
C. Hypericorum Lk. Spec. Plant II, p. 24 (1825).
C. Androsaemi Almeida et Camara, in Bol. da Soc. Brot. XXIV, p. 10, extr. (1909).
Erysibe Hypericorum Wallr. Fl. crypt. Germ. II, p. 199 (1833).
Pucciniastrum Hypericorum Karst. Myc. fenn. IV, p. 56 (1878).

var. australis n. var.

I. Aecidia hypophyllous, on yellow or red-brown leaf-spots, scattered, minute. 0·3–0·5 mm. diam., round or sub-circular, not very prominent, soon becoming naked, orange-yellow, surrounded by the torn epidermis, which has more or less the appearance of a peridium, without paraphyses. Aecidiospores in short chains, sub-globose or angular, delicately verruculose, pale orange within, 14–24 × 18–20 μ, epispore 1·5–2 μ thick.



Melampsora Hypericorum var. *australis*. Teleutosorus.

II. Teleuto-sori hypophyllous, sub-epidermal, scattered or in groups, very minute, usually not more than 0·1 mm. diam., at first red-brown, later almost black. Teleutospores cylindrical, prismatic, rounded at the apex, and often slightly thickened (up to 3 μ), brown or light brown, 40 μ, epispore scarcely 1 μ thick.

Host: Hypericum aethiopicum Thun., Inanda, Natal, September, 1881, Medley Wood [9480 and 10361]; Lydenburg District, 25.1.11, Pienaar [1074]; Pretoria, 30.3.11, Pole Evans [1302]; Garstfontein, Pretoria District, 6.12.11 and 31.12.11, Pienaar [1946 and 1988]; Rietfontein, Pretoria District, 29.12.15, Pole Evans [9314].

Distribution: The type occurs in Europe, Asia Minor and North Africa; the variety in the Transvaal and Natal. It differs from the type in having much longer teleutospores, 40–70 μ instead of 20–40 μ.

4. **Melampsora Junodii** n. sp.

II. Uredo-sori hypophyllous, on minute yellow leaf-spots, which are apparent on the upper surface, scattered or in small groups, round, very minute, yellow, pulverulent. Uredospores ellipsoid or ovate, more rarely sub-globose, yellow or light brown within, 20–34 × 16–20 μ; epispore hyaline, about 1 μ thick, closely and delicately verruculose-echinulate; germ pores obscure. Paraphyses capitate, 15–16 μ diam. at the apex.

Melampsora Junodii. Teleuto-sorus.

III. Teleuto-sori hypophyllous, sub-epidermal, on brown leaf-spots, scattered, round, minute, often confluent and thus becoming larger, dark brown. Teleutospores cylindrical-prismatic, yellow-brown, 20–40 × 10–16 μ, epispore slightly thickened at the apex (about 3 μ).

Host: Vernonia senegalensis Less., Rikatli, Portuguese East Africa, September, 1918, Junod [11723].

5. **Melampsora Ricini** Pass.

in Erb. Critt. Ital. Ser. II, fasc. XIV, No. 684 (1878); Syd. Monogr. Ured. III, p. 391.

Syn. *Caeoma Ricini* Schlecht. in Linnaea I, p. 612 (1826).

Uredo Ricini Bev. Bern. in Stirp. rariorum minusque cognitarum in Sicilia sponte prov. descript. Manip. III, p. 10 (1815).

Melampsorella Ricini De Toni in Sacc. Syll. Fung VII, p. 596 (1888)

II. Uredo-sori hypophyllous, rarely epiphyllous, on minute yellow leaf-spots, 0·5–2 mm. diam., scattered or in small groups, often arranged in circles, sometimes confluent, round, 0·25–1 mm. diam., soon becoming naked, orange-yellow. Uredospores ovate, ellipsoid or ovate-oblong, closely and equally verrucose, yellow, 19–28 × 17–22 μ, epispore 2–3 μ thick. Paraphyses numerous, capitate, hyaline or yellow at the apex, 40–55 μ long, 17–24 μ broad at the apex, wall 2–4 μ thick.

III. Teleutospores unknown.

Host: Ricinus communis L., Inanda, Natal, Medley Wood [10161]; Somerset East, 1875, MacOwan [10163]; Pretoria, 5.5.06 [55]; Northern Transvaal, 18.6.06 [179]; Umbelusi, Portuguese East Africa, 3.8.08, Howard [524]; Kenilworth, Cape Province [738]; Grahamstown, Cape Province, 13.8.08 [1013]; Groenkloof, Pretoria District, 17.2.14, Turner [7402]; Gazaland, Southern Rhodesia, 9.9.17, Swynnerton [10715]; Buffelspoort, Rustenburg District, 21.5.18, Pallister [11505]; Pretoria, 15.9.20, Thomson [14203].

Distribution: South and Central Africa, North Africa, East India, Southern Europe.

6. **Melampsora Vitellinae** Thuem. (*sensu lato*).

Sacc. Syll. Fung. VII, p. 589.

II. Uredo-sori mostly hypophyllous, occasionally epiphyllous, up to 1 mm. diam., bright orange. Uredospores ovate, oblong or sub-clavate, 26–44 × 12–16 μ; epispore 2–3 μ thick, rather coarsely and remotely aculeate, smooth at the apex. Paraphyses clavate to capitate, 40–60 μ long, 22 μ broad at the apex.

Host: Salix capensis Thun., Vaal River, Boshoff District, Orange Free State, 12.6.10, Burtt Davy [923].

This rust is only known in the uredo-stage. Sydow, in his monograph, describes twenty-four species of Melampsora on Salix which are chiefly distinguished by the aecidial host. It is not possible, therefore, to determine the species until the aecidial and teleuto stages are known. The above is an interim determination for record purposes, cfr. Melampsora aecidioides.

SCHROETERIASTER P. Magn.

in Berichte der Deutsch. Bot. Gesellschaft XIV, 1896, p. 130.

O. and I. Spermogones and aecidia unknown

II. Uredo-sori minute, sub-epidermal, pulvinate, often remaining covered for a considerable time, without peridium, paraphyses none. Uredospores abstricted singly, subglobose to oblong or pyriform, aculeate, coloured, germ pores more or less distinct.

III. Teleuto-sori sub-epidermal, minute, and forming a compact crust. Teleutospores in several layers, prismatic, ellipsoid or oblong, coloured, smooth, 1-celled, with a single germ pore which is often obscure. Promycelium typical, 4-celled.

South African species two, both on Croton spp.

Schroeteriaster stratosus (Cke) Syd.

in Monogr. Ured. III, p. 402 (1915).

Syn. *Melampsora stratosa* Cke. in Grevillea X, p. 128.

II. Uredo-sori hypophyllous, or a few occasionally epiphyllous, scattered or often more or less equally covering the whole leaf surface, round, about 0·5 mm. diam., soon becoming naked, pulverulent, rusty-brown. Uredospores ovate or pyriform, rather sparsely and coarsely set with acute aculeae, closely aculeate at the apex, yellow to yellow-brown, 30–42 × 17–23 μ, epispore 2·5–3·5 μ thick, 4–10 μ thick at the apex; with 4 equatorial germ pores.

Schroeteriaster stratosus.
Teleutosorus and uredospores.

III. Teleuto-sori hypophyllous, often surrounding a central uredo-sorus, more or less confluent and forming round groups, 1–2 mm. diam., which are pale to dark brown. Teleutospores superposed in 3–6 layers, mostly oblong, light brown, outer layer of spores thickened at the apex (5–10 μ), 27–44 × 15–22 μ; epispore 2–2·5 μ thick.

Host: Croton sylvaticum Hochst., Inanda, Natal, 12.1.81, Medley Wood [363 and 10363]; Winkle Spruit, Natal, 29.1.12, 6.5.12 and 14.2.13, Pole Evans [2020, 2383, and 5639]; Winkle Spruit, 6.7.12, Doidge [2500].

Distribution: South Africa.

Schroeteriaster Doidgeae Syd.

in Ann. Myc. XXIV, p. 265, 1926.

II. Uredo-sori amphigenous, almost equally developed on both leaf surfaces, scattered or in small irregular groups, round, conspicuously surrounded by the torn epidermis, rusty-brown, pulverulent. Uredospores usually ovate, ovate-oblong or pyriform, more rarely ovate-globose, deep yellow or orange-yellow, 35–46 × 20–30 μ; epispore evenly 2·5–3·5 μ thick, not thickened at the apex, coarsely and remotely aculeate, and with 4 equatorial germ pores.

III. Teleutospores not known.

Host: Croton gratissimum Burch., Waterberg, Transvaal, 4.8.19, leg. Pole Evans [14173].

PUCCINIASTRUM Otth.

Mitteil. Naturf. Ges. Bern., 1861, p. 71.

O. Spermogones sub-cuticular, flattened and conoid.

I. Aecidia erumpent, cylindrical, with a definite peridium. Aecidiospores catenulate, sub-globose, ovate, or ellipsoid, usually verrucose.

II. Uredo-sori sub-epidermal, very minute, opening by a central pore, usually surrounded by a hemispherical peridium. Uredospores solitary, pedicellate, sub-globose to oblong, contents yellow, epispore hyaline, echinulate or verruculose, germ pores indistinct.

III. Teleuto-sori sub-epidermal, intercellular, usually very minute, crustaceous. Teleutospores spherical to oblong, vertically or obliquely 2-pluriseptate, smooth, coloured, germinating to form a 4-celled promycelium.

South African species, one.

Pucciniastrum Agrimoniae (Diet.), Transzch.

in Scripta Bot. Hort. Univ. Petropol. IV, 1895, p. 301; Syd. Monogr. Ured. III, p. 446.

Syn. *Caeoma* (*Uredo*) *Agrimoniae* Schw. in N. Amer. Fung., p. 191 (1832).
Coleosporium ochraceum Bon. Coniomyceten u. Crypt., p. 20 (1860).
Uredo Potentillarum D.C. var. *Agrimoniae Eupatoriae* D.C. Fl. franc. VI, p. 81 (1815).
U. Agrimoniae Schroet in Pilze Schles. p. 374 (1887).
U. Agrimoniae-Eupatoriae Wint. in Pilze Deutschl, p. 252 (1881).
Thecopsora Agrimoniae Diet. in Hedwigia XXIX, p. 153 (1890).
Pucciniastrum Agrimoniae-eupatoriae Leigh. in Tromso. Mus. Aarscheft XVII, p. 92 (1895).
P. ochraceum Lind. in Danish Fungi as repres. in Herb. of E. Rostrup, p. 293 (1913).
Melampsora ochracea Rostr. in sched.

II. Uredo-sori hypophyllous often on small yellow or purplish leaf-spots, scattered or mostly more or less closely crowded, very minute, blister-like, 0·1 0·3 mm. diam., round, orange, becoming pale yellow with age, early opening by a central pore and becoming pulverulent. Peridium rather thin, hemispherical, composed of minute, cubical smooth thin-walled cells (wall 2 μ thick), cells near the pore being rather thicker-walled, cells round the ostiole larger, 20–25 μ high, thick-walled (3–5 μ), smooth or minutely echinulate above. Uredospores globose, sub-globose, ovate or ellipsoid, briefly echinulate, yellow, 15–22 × 12–17 μ; epispore 1·5 μ thick.

II. Teleuto-sori hypophyllous, sub-epidermal, irregular, minute, light brown or red-brown. Teleutospores intercellular, solitary or irregularly grouped, spherical, oblong or cuneate, smooth, yellow-brown, usually divided into 4 cells by longitudinal and horizontal septa, 18–30 × 16–30 μ; epispore uniformly about 2 μ thick.

Host: Agrimonia Eupatoria L. var. capensis, Cape, MacOwan [10157 and 10158]; Inanda, Natal, Medley Wood [332]; Fort Beaufort, Cape Province, March, 1907, Pole Evans [303]; Garstfontein, Pretoria District, 15.1.11, 19.2.11, 26.3.11, 15.2.12, and 14.5.13 [1150, 1202, 1261, 2147, and 6655]; Maritzburg, 9.4.11, Pole Evans [1407]; Grootfontein, near Harrismith, Orange Free State, 17.5.12, van der Byl [2313]; Kentani, Cape Province, 12.6.12, Pegler [2353]; Lidgetton, Natal, Mogg [11638]; Tweedie, Natal, Mogg [11649]; Groenkloof, Pretoria District, 8.2.15, Pole Evans [18081]; Haenertsburg, Northern Transvaal, Doidge [20323].

Distribution: South Africa, Europe, East India, Japan, Canary Islands, North and Central and South America.

The uredo-stage is extremely common in South Africa.

MILESINA P. Magn.

in Berichte Deutsch. bot. Ges. XXVII, 1909, p. 325.

O. and I. Spermogones and aecidia unknown.

II. Uredo-sori sub-epidermal, minute, with a definite peridium, opening by an apical pore. Uredospores solitary, pedicellate, sub-globose to oblong, hyaline, aculeate, germ pores obscure.

III. Teleutospores in the epidermal cells, 2–pluri-cellular, smooth, hyaline, germinating without a resting period to form a 4-celled pro-mycelium.

South African species, two; the rusts belonging to this genus occur only on ferns.

Milesina Dieteliana (Syd.) P. Magn.

in Ber. Deutsch. bot. Ges. XXVII, 1909, p. 325 ; Syd. Monogr. Ured. III, p. 479.

Syn. *Melampsorella Dieteliana*, Syd. in Ann. Myc. I, p. 537 (1903).
Milesia Polypodii B. White in Scot. Naturalist. IV, p. 162 (1877).

II. Uredo-sori hypophyllous, on leaf-spots which are yellow-brown to almost black, scattered or in groups, minute, round, 0·1–0·25 mm. diam. ; yellow-brown, surrounded by a peridium of which the upper part is composed of irregularly polygonal cells. Uredospores extremely variable in form and size, ovate or oblong, more rarely sub-globose, briefly and sparsely aculeate, hyaline, 24–40 × 15–25 μ ; epispore 2–2·5 μ thick.

III. Teleutospores evolved inside the epidermal cells, solitary or more frequently closely crowded, 2–4-celled, smooth, hyaline, 12–10 μ long and 12–25 μ broad ; epispore 1 μ thick.

Host : Polypodium lycopodioides Linn., Amanzimtoti, Natal, 10.7.11, Doidge [1634].

Distribution : South Africa, Europe.

I am unable to distinguish this species morphologically from the fungus on P. vulgare which occurs in Europe (Syd. Ured. 2396, 2597).

Milesina nervisequa Syd.

in Monograph Ured. III, p. 481.

Syn. *Caeoma nervisequum* Thuem. in Flora LX, p. 412 (1877).

II. Uredo-sori hypophyllous, on red-brown leaf-spots, scattered or in irregular rows between the secondary veins of the leaflets, round, minute, 0·25–0·45 mm. diam., long remaining closed, yellow, surrounded by a thin peridium. Uredospores sub-globose, ovate ellipsoid or oblong, very briefly and closely echinulate, hyaline, 20–28 × 15–18 μ ; epispore 1–1·5 μ thick.

III. Teleutospores unknown.

Host : Pellaea hastata Link., Natal, Medley Wood [10162] ; Garstfontein, Pretoria District, 28.11.10, Pienaar [999] ; Durban, Natal, 13.4.11, Pole Evans [1370] ; Lemana, Northern Transvaal, 14.8.11, Doidge [1836].

Distribution : South Africa.

UREDINOPSIS P. Magn.

in Atti del Congresso Botanico Internazionale Genova (1892), 1893, p. 167.

O. Spermogones inconspicuous, sub-cuticular, honey-coloured.

I. Aecidia briefly cylindrical or slightly compressed laterally : peridium membraneous, dehiscing at the apex. Aecidiospores globose to ellipsoid, verrucose.

II. Uredo-sori sub-epidermal, minute, round, bullate, yellow to brown, surrounded by a delicate peridium. Uredospores solitary, pedicellate, of two forms ; some ovate-fusiform or fusiform, usually acute at the apex or produced into an appendage of varying length, usually with one row of warts or aculeae, otherwise smooth, thin-walled ; others globose, ovate or angular, hyaline, rather thick-walled and uniformly and rather closely verruculose ; germ pores obscure.

III. Teleutospores usually solitary in the mesophyll, more rarely in small groups under the epidermal cells, globose or broadly ellipsoid, smooth, hyaline, usually 2–4-celled, rarely 1 or pluricellular ; promycelium 4-celled, bearing globose sporidia.

A genus of eleven species parasitic on ferns, mostly in the north temperate zone South African species, one.

Uredinopsis macrosperma P. Magn.

in Hedwigia XLIII, p. 122; Syd. Monogr. Ured. III, p. 491.

Syn. *Uredo macrospermum* Cke. in Grevillea VIII, p. 71 (1879).

Uredinopsis Pteridis Diet. et Holw. var. *congensis* P. Henn. in E. de Wildeman, Etudes sur la Flora du Bas et Moyen Conge II, fasc. 2, p. 8 (1907).

II. Uredo-sori hypophyllous, on yellow or brownish leaf-spots, scattered, 0·2–0·5 mm. diam., round, yellow, surrounded by a peridium. Uredospores ovate-oblong or ovate fusiform, rounded at the apex and usually with a minute verruciform appendage about 3 μ long, more rarely attenuate, hyaline, 26–46 × 12–18 μ; epispore 1·5 μ thick, with a single longitudinal row of warts, otherwise smooth.

III. Teleutospores under the epidermis on the upper and lower leaf surfaces, scattered or irregularly grouped, globose or ellipsoid, 2–6-celled, smooth, hyaline, 25–35 × 20–30 μ; epispore 1 μ thick.

Host: Pteris aquilina L. Inanda, Natal, Medley Wood [10590 and 11224].

Distribution: South and Central Africa, Asia, North and South America.

ENDOPHYLLUM Lev.

in Mem. Soc. Linnéenne de Paris IV, 1825, p. 208.

O. Spermogones sub-epidermal, deeply immersed, globose or conical.

III. Teleuto-sori sub-epidermal, aecidiiform, round, yellow, usually with a well-developed peridium, which is at first closed, then broadly cupulate, finally pulverulent. Teleutospores catenulate, easily falling apart, unicellular, globose, angular or ellipsoid, at first with intercalary cells which finally disappear, verrucose, pale yellow to brown; germinating early to form a typical 4-celled pro-mycelium.

This interesting genus is at present represented by only one South African species. This was originally described as Aecidium elegans, but the life history was worked out in 1908 by Dr. Pole Evans, who showed that the apparent aecidiospores germinate to form a typical promycelium, and must therefore be regarded as teleutospores. It is possible that a study of other so-called "aecidia" might reveal other similar species.

Endophyllum MacOwani Pole Evans.

in Rept. S.Afr. Ass. for the Adv. of Science, 1908 (publ. 1909, p. 252); Syd. Monogr. Ured. III, p. 332.

Syn. *Aecidium elegans* Diet. in Hedwigia XXVIII, 1889, p. 180.

O. Pycnidia epiphyllous, almost black, 130–160 μ diam.

III. Teleuto-sori hypophyllous; solitary or in small groups, up to 2 mm. diam., narrow, cylindrical, about 1 mm. long, rather deeply immersed and 150–200 μ diam., margin of the peridium slightly recurved, white, almost entire; cells of the peridium firmly joined together, 40–60 × 24–35 μ, rhomboid or polygonal; outer wall striate, 6–10 μ thick, inner verrucose, 4–6 μ thick. Spores irregularly polyhedral, 16–25 μ diam., epispore hyaline, 2·5 μ thick, thickened up to 12 μ at the apex.

Host: Rhamnus prinoides L'Herit., Somerset East, Cape Province, MacOwan [4275]; George, July, 1908 [379]; Woodbush, Northern Transvaal, 5.8.11, Doidge [1772]; Kentani, Cape Province, 4.3.12, Pegler [2097]; Knysna, Cape Province, 3.6.12, Pienaar [2418]; George, 9.5.23, Doidge [17114]; Deepwalls, Knysna, 13.5.23, Doidge [17215].

Distribution: South Africa.

PUCCINIOSIRA Lagh.

in Ber. d. Deutsch. bot. Bes. IX, 1891, p. 344.

O. Spermogones sub-epidermal, inconspicuous, flask-shaped.

I. II. Aecidia and uredospores not known.

III. Teleuto-sori sub-epidermal, minute, with a cylindrical peridium, which finally dehisces at the apex, light coloured. Teleutospores catenulate, ovate to oblong, horizontally 1-septate, smooth or verruculose, hyaline or sub-hyaline, when mature germinating immediately to form a 4-celled pro-mycelium.

A small genus with three African species, of which only one is known to occur in South Africa.

Pucciniosira Dissotidis Wakef.

in Kew Bulletin, 1917, p. 313; Syd. Monogr. Ured. IV, p. 325.

Syn. *Aecidium Dissotidis* Cke. in Grevillea X, 1882, p. 124.

Uredo Dissotidis Cke., *loc. cit.*

U. Dissotidis longicaudae P. Henn. in H. Baum. Bot. Ergebnisse der Kunene-Sambesi Exped., p. 159 (1902).

Puccinia Dissotidis P. Henn. in Flore du Bas- et Moy- Congo in Ann. Mus. du Congo II, p. 222 (1908).

III. Teleuto-sori hypophyllous on dry brown spots of varying size, 2–10 mm. diam., closely crowded, immersed, briefly cylindrical, 150–200 μ diam., honey-yellow or yellow-brown. Peridium composed of cells 25–30 × 18–22 μ, which are thin-walled, verruculose. Spores in chains, hyaline, 2-celled, 30–40 × 16–20 μ, smooth, finally falling apart, without petiole, epispore 1 μ thick.

Pucciniosira Dissotidis. Portion of a chain of teleutospores (after Wakefield).

Hosts: Dissotis incana Triana, Natal, Medley Wood [10288 and 11194].

Dissotis princeps Triana, Natal, Medley Wood [10289].

Dissotis sp., Kyagu, Uganda, April, 1915, Dummer 2157 [12038].

Distribution: South and tropical Africa.

The teleutospores were found by Miss Wakefield on Dummer's material, and described by her as Pucciniosira Dissotidis. Sydow states that all the species given as synonyms should come here, and that the bodies described as aecidiospores are really peridial cells.

Our material, including Dummer's 2157 (one of Nos. quoted by Miss Wakefield), is very scanty and in poor condition; it shows only what appear to be peridial cells. The above description is taken from Sydow (*loc. cit.*).

CRONARTIUM Fr.

Obs. Myc. I, 1815, p. 220.

O. Spermogones sub-epidermal, deeply immersed, rather large.

I. Aecidia, when present, erumpent, at first vesiculose, with a membranous peridium, which splits irregularly, composed of 1–4 series of cells, which are smooth or slightly verrucose outside, and grossly verrucose within. Aecidiospores globose to ellipsoid, verrucose.

II. Uredo-sori sub-epidermal, erumpent, minute, usually surrounded by a peridium, which is delicate, and evanescent, and opens at the apex by a pore more rarely surrounded by paraphyses. Uredospores globose to ellipsoid, echinulate, solitary, epispore hyaline, germ pores none or obscure.

III. Teleuto-sori erumpent, at first arising from the uredo-sori, forming a cylindrical or filiform column of varying length, which is hard when dry. Teleutospores catenulate, very closely connected in all directions, oblong to cylindrical or fusiform, one-celled, smooth, light coloured, germinating immediately to form a typical 4-celled pro-mycelium, which bears globose or sub-globose peridia.

Of the twenty-two known species of this genus, only one occurs in Africa.

Cronartium Gilgianum P. Henn.

in Engl. Bot. Jahrb. XXII, 1895, p. 83; Syd. Monogr. Ured. III, p. 582.

Syn. *Cronartium Bresadoleanum* P. Henn., Pilze Ostafrikas in A. Engler; Die Pflanzenwelt. Ostafrikas und der Nachbargebiete, Berlin (D. Reuner), Teil C., p. 51 (1895).

O. Spermogones epiphyllous, numerous, closed or open, in groups, which may be small, or larger and up to 1 cm. long, round, black, 120–200 μ diam.

III. Teleuto-sori hypophyllous, rather closely crowded in groups up to 3 cms. diam., filiform, reddish-brown, up to 1 cm. long, 100–200 μ thick. Teleutospores fusiform to clavate-cylindrical, round or attenuated at the ends, yellow, smooth, 70–110 × 14–21 μ, epispore 1–2 μ thick.

Cronartium Gilgianum. Part of teleutosorus.

Hosts: Euclea lanceolata E. Mey., Koedoe's River, Northern Transvaal, 7.8.11, Doidge [1737]; Lemana, Northern Transvaal, 14.8.11, Doidge [1738].

Euclea macrophylla E. Mey., Nelspruit, Thomson [729]; Barberton, 4.2.11 and 29.8.11 [1151 and 1852]; Winkle Spruit, Natal, 13.4.11, Pole Evans [1399]; Lemana, Northern Transvaal, 14.8.11, Doidge [1739]; Barberton, 24.10.12, van der Byl [5620]; Barberton, 4.2.24, Thorncroft [18097].

Euclea natalensis A.DC., Amanzimtoti, Natal, 10.7.11, Doidge [1606]; Stella Bush, Durban, 11.7.11, Doidge [1617]; Umgeni Beach, Durban, 4.6.12, Pole Evans [2415]; Winkle Spruit, Natal, 6.7.12, Doidge [2509]; Isipingo, Natal, 13.5.13, Doidge [6646]; Kentani, Cape Province, 1.8.15 and 6.9.15, Pegler [9089 and 9115]; East London, 19.7.19, Doidge [12420].

Euclea Rellan Hochst., Bulawayo, Rhodesia, November, 1918, Eyles [12170].

Distribution: South and Central Africa.

COLEOSPORIACEAE.

Teleutospores in 1 or more rarely 2 sub-epidermal layers, dividing as they mature into 4 superimposed cells, each of which germinates by a sterigma bearing 1 basidiospore. Uredospores single or catenulate. Aecidia, when present, with a peridium.

This family is characterized by the internal basidium, i.e. the teleutospore itself becomes the promycelium. The group consists of five widely separated genera, of which only one, Coleosporium, is known in South Africa.

COLEOSPORIUM Lév.

in Annales des Sciences nat. III; ser. Botanique vol. VIII, 1847, p. 373.

O. Spermogones flattened-cunoid, sub-epidermal, without ostiolar filaments.

I. Aecidia peridermium-like, laterally compressed, surrounded by a peridium, consisting of a single series of cells and dehiscing irregularly. Aecidiospore catenulate, intercalary cells soon disappearing, globose to oblong, verrucose, epispore hyaline.

II. Uredo-sori minute, sub-epidermal, without peridium, erumpent, yellow. Uredospores globose to oblong, catenulate, at first connected by intercalary cells, which soon disappear, verrucose (warts usually elongated and easily breaking off), epispore hyaline, germ pores obscure.

III. Teleuto-sori minute, rarely larger, often confluent, sub-epidermal, flat or somewhat convex, waxy. Teleutospores closely connected laterally and not falling apart, sessile, cylindrical, clavate or prismatic, at first 1-celled, then, on germination, 4-celled, contents orange-coloured, smooth, epispore hyaline, strongly thickened at the apex. Sporidia borne on long sterigmata, large, ovate.

South African species, three.

Coleosporium Clematidis Barc.

in Descript. List. Ured. Simla III; in Journ. Asiatic Soc. of Bengal LXI, Pt. II, 1890, p. 89; Syd. Monogr. Ured. III, p. 653.

Syn. *Caeoma Clematidis* Thuem. in Mycotheca univers. No. 539 (1876).

II. Uredo-sori hypophyllous or an occasional one also epiphyllous, often on yellow leaf-spots scattered, round, minute, 0·3–0·5 mm. diam., yellow or orange, becoming paler with age. Uredospores sub-globose, ovate, ellipsoid or oblong, closely verrucose, 18–32 × 14–21 μ; epispore hyaline, 1·5 μ thick or somewhat thicker, up to 2·5 μ.

[III. Teleuto-sori hypophyllous, scattered or circinate, round or irregular, 0·5–1 mm. diam., prominent, orange-yellow, later dull, ochre-yellow. Teleutospores cylindrical to clavate, apex rounded and strongly thickened (14–25 μ), base usually rounded, 60–105 × 13–26 μ.]

Hosts: Clematis brachiata Thun., at foot of the Boschberg Mts., near Somerset East 1875; MacOwan (Rabh. Fung. Eur. 4043) [4383 and 10160]; Natal, Medley Wood [10580]; Barberton, Transvaal, 29.8.11, Pole Evans [1861]; Kentani, Cape Province, 6.6.12, Pegler [2359].

Clematis Oweniae Harv., Inanda, Natal, Medley Wood 801 [10581 and 11223].

Distribution: South and central Africa, East India, China, Japan, East Siberia.

The above collections are only in the uredo-stage.

Coleosporium Hedyotidis Kalch. et Cke.

in Grevillea IX, 1880, p. 21; Syd. Monogr. Ured. III, p. 635.

II. Uredo-sori amphigenous (more often hypophyllous) and caulicolous, scattered or irregularly grouped and becoming confluent, round elliptic, or irregular, convex, bullate, 0·3–0·5 mm. diam., long covered by the epidermis, orange. Uredospores globose, ovoid or ellipsoid, closely verruculose, 16–28 × 14–20 μ; epispore hyaline, 1·5–2 μ thick or even thicker (up to 3 μ).

III. Teleutospores unknown.

Host: Hedyotis amatymbica Hochst., Inanda, Natal, Medley Wood [10156]; The Willows, 1.5.06, Burtt Davy [36]; Swaziland, January, 1905, Burtt Davy [52]; Garstfontein, Pretoria District, 25.3.11, 13.4.11, 23.3.12 and 3.5.13, Erasmus [1256, 1419, 2194 and 6600]; Skinner's Court, Pretoria District, 22.4.11, Pole Evans [1456]; Garstfontein, Pretoria District, 7.3.15, Pienaar [8908]; Bethlehem, Orange Free State, 5.3.15, van der Merwe [8910]; Groenkloof, Pretoria District, 16.4.16, Pole Evans [9692]; Mooi River, Natal, 21.3.17, Mogg [10067].

Distribution: South Africa.

Coleosporium Ipomoeae Burr.

Parasitic Fungi of Illinois, Part I, in Bull. Ill. State Lab. Nat. Hist. II, 1885, p. 217 ; Syd. Monogr. Ured. III, p. 643.

Syn. *Uredo Ipomoeae* Schw. Syn. Fg. Carol., p. 70 (1882).
Caeoma Ipomoeae Link., in Spec. Plant. II, p. 14 (1825).
Coleosporium guaraniticum Speg., in Annal. Soc. Cient. Argent. XVII, p. 95 (1884).
C. Fischeri Eug., Mayor in Mem. Soc. Neuchatel. Sc. nat. V, p. 550 (1913).

II. Uredo-sori hypophyllous, often on yellow leaf-spots, scattered or becoming grouped, round, 0·25–1 mm. diam., soon becoming naked, orange coloured, becoming paler. Uredospores sub-globose, ovate or ellipsoid, often angular, 17–27 × 13–21 μ ; epispore 1–1·5 μ thick or up to 2 μ, closely verruculose.

[III. Teleuto-sori hypophyllous, scattered or grouped, minute, 0·25–0·5 mm. diam., often becoming larger and irregular by confluence, orange-coloured, later pale yellow. Teleutospores cylindrical-clavate, rounded at the apex, and strongly thickened, rounded or attenuate at the base, 70–115 × 18–26 μ.]

Host : Hewittea bicolor Wight., Inanda, Natal, January, 1881, Medley Wood [9479] ; Winkle Spruit, Natal, 2.7.11, Pole Evans [1598] ; Winkle Spruit, 6.7.12 and 27.5.15, Doidge [2501 and 9100].

Distribution : Natal, North, Central, and South America.

Only the uredo-stage has been found in Natal. I am indebted to Dr. Sydow for the correct determination of this species, which has not previously been recorded from Africa.

UREDINALES IMPERFECTI.

There are a number of species of Uredineae of which the teleuto stage is unknown, and for these it is convenient to have a form genus in which they may be placed until the life history is more fully investigated.

The different phases in the life-history of a rust were, in the early days of mycology, considered to be separate fungi, and were described as separate genera such as Aecidium, Caeoma, Uredo, etc. ; subsequent to the classical experiments of De Bary (1865), who definitely established the polymorphism of such heteroecious forms as Puccinia graminis, the Uredinales have received much attention from mycological workers, and by means of culture experiments many of the form species have been connected with a teleuto stage and their names have lapsed into synonymy. Even in Europe, however, there are aecidia and uredo forms which have not been connected with any teleuto-stage, and for which the form genera must for the present be retained. Very little culture work has been done in South Africa and the fact that 72 species of the form genus Aecidium are described in this paper is an indication of the scope for research in this direction.

AECIDIUM Pers.

in J. F. Gmel. Syst. Nat., Vol 2, p. 1472, 1791.

Spermogones immersed, flask-shaped, honey-coloured.

Aecidia at first immersed, closed, then erumpent, open cupulate or cylindrical, scattered or grouped, often on discoloured spots and not infrequently causing more or less hypertrophy of the affected parts of the host. Peridium usually well developed, white or yellowish, with margin entire, incised or lacerate, erect or revolute. Spores catenulate, angular, sub-globose or ellipsoid, epispore hyaline usually verruculose, germ pores usually obscure.

South African species, of which the teleuto-stage is unknown, 72.

Species parasiti: on **Compositae.**

Aster (Tourn.) L.

1. **Aecidium flustra** Berk.

in Grev. XXX, 1892 p. 110.

Aecidia hypophyllous, on yellow leaf-spots, closely crowded in circular groups, 2–5 mm. diam., remaining closed for some time, later open, cupulate, 300–500 μ diam.; cells of the peridium elongated, 40–75 μ long, 18–26 μ broad, walls of about equal thickness, 2–3 μ, verrucose. Spores variable, usually ellipsoid or ovate, yellow or yellow-brown, 26–50 × 20–26 μ; epispore 2–2·5 μ thick, closely verrucose; germ pores, distinct.

Host: Aster sp., Natal

Compare Ae. Woodianum.

Conyza Less.

2. **Aecidium MacOwanianum** Thuem

in Flora LVIII, 1875, p. 380; Syd. Monogr. Ured. IV., p. 31.

Aecidia hypophyllous, on yellow or yellow-brown leaf-spots, 4–6 mm. diam., these are at first round, but often become confluent and form longer irregular discoloured areas, in groups cupulate, yellow; margin of the peridium revolute, incised; cells of the peridium, or sub-rhomboid, 20–30 × 16–20 μ, outer wall 6–8 μ thick, striate, inner wall about 3 μ thick, verrucose. Spores sub-globose ovate or ellipsoid, sub-hyaline 17–20 × 15–17 μ; epispore hyaline, very delicately verruculose, 1–1·5 μ thick.

Hosts: Conyza incisa Ait., on leaves Innada, Natal, 1877, Medley Wood [10294]; Winkle Spruit, Natal, 13.4.11, Pole Evans [1398]; Winter's Kloof, Natal, 27.6.11, Doidge [1616]; Kentani, Cape Province, 23.10.15, Pegler 2361 [9118].

Conyza ivaefolia Less., Boschberg, Cape Province, 1874, MacOwan 1037 [4065]; Hennops River, Pretoria District, 5.1.11, Pole Evans [1052]; Umsindusi River, Maritzburg, 9.4.11, Pole Evans [1408]; Natal (without locality), 13.4.11, Pole Evans [1458]; Equeefa, Zululand, 24.4.11, Fuller [1538]; Henley, Natal, 24.5.15, Doidge [9088]; Kentani, Cape Province, 24.11.18, Pegler [11789].

Distribution: Natal and Zululand.

3. **Aecidium Conyzae pinnatilobatae** Syd.

in Monogr. Ured. IV, p. 32.

Syn. *Aecidium MacOwanianum* Thuem. forma. *Conyzae pinnatilobatae* Thuem. in Flora LVIII, p. 380 (1875).

Aecidia hypophyllous, usually in groups on yellow or yellow-brown spots, 3–6 mm. diam., cupulate, 250–300 μ diam.: margin of the peridium white, revolute, incised; cells of the peridium sub-rhomboid, 20–28 × 16–20 μ, outer wall very delicately striate 4–7 μ thick, inner verrucose about 3 μ thick. Spores angular globose or ellipsoid, closely and very minutely verruculose, sub-hyaline, 15–19 × 13–17 μ; epispore hyaline 1 μ thick, often thicker at the apex (2–5 μ).

Hosts: Conyza pinnatilobata DC., near Somerset East, 1875, MacOwan [1111]. Kentani, Cape Province, 3.2.15, Pegler, 1974 [8855]; Natal, Medley Wood [10295 and 10296]

Conyza podocephala DC., Irene, Transvaal 23.1.08 [444]; Pretoria, March, 1910, Doidge [898]; Garstfontein, Pretoria District, 8.4.11 and 19.2.11, Pienaar [1436 and 1213]; Pretoria, 13.2.15, Howlett [8924].

Distribution: South Africa.

Spores more angular than those of Ae. MacOwanianum and thickened at the apex

Denekia Thun.

4. **Aecidium Denekiae** n. sp.

Aecidia hypophyllous, in round groups up to 1 cm. diam., sometimes covering the whole leaf surface, immersed, cupulate, 240–320 μ diam , margin of the peridium white, reflexed, laciniate, cells of the peridium rhomboid, firmly joined together, 30–40 × 14–20 μ, outer wall faintly striate, 5–6 μ thick, inner delicately verruculose, 4–5 μ thick. Spores sub-hyaline, angular-globose, ovate or ellipsoid, 16–23 × 3–20 μ ; epispore 1·5–2 μ ; epispore 1·5–2 μ thick, closely and delicately verruculose.

Host : Denekia capensis Th., Mooi River, Natal, 26.10.18, Mogg [11798].

Dimorphotheca Vaill.

5. **Aecidium Serrae** Syd.

in Ann. Myc. X (1912), p 35 ; Monogr. Uied. IV, p. 58.

Spermogones amphigenous, numerous, 100–125 μ diam., at first honey-coloured, then darker.

Aecidia hypophyllous, an occasional one being epiphyllous, on yellow spots which are at first circular and later become confluent and irregular, 0·5–1·5 cm. long, more or less closely crowded, often arranged in a circle surrounding the spermogonia, briefly cylindrical, 250–300 μ diam., margin revolute, slightly incised. Cells of the peridium 26–40 × 22–30 μ, outer wall smooth, 4–7 μ thick, inner densely verrucose, 3–5 μ thick. Spores angular-globose or ellipsoid, closely and very delicately verruculose, sub-hyaline, 16–22 × 13–17 μ, epispore 1·5 μ thick, often thickened at the apex (3–6 μ).

Hosts : Dimorphotheca sp., Belfast, Transvaal, November, 1909, Doidge [761].

Dimorphotheca Zeyheri Sond., Smithfield, Orange Free State, Van der Merwe [1048].

The host of the type collection (761) was originally incorrectly determined as Senecio serra, it is certainly a Dimorphotheca, but cannot be assigned to a species on material available.

Elytropappus Cass.

6. **Aecidium Elytropappi** P. Henn.

in Hedwigia XXXVII, p. 294 ; Syd. Monogr. Ured. IV, p. 36 (erronee sub-nomine *Aecidii Elythropappi*).

Aecidia on the leaves and branches, when on the leaves solitary or in small groups ; most frequently on the stems, forming fusiform, thickened areas 1–3 cm. long on which the aecidia are closely crowded ; cylindrical, deeply immersed and protruding to a length of 2 mm., about 200 μ diam , orange, with erect, incised margin, cells of the peridium firmly joined, 25–35 μ long ; outer wall striate, very thick (13–20μ) ; inner wall ve ruculose 3–5 μ thick. Spores angular-globose, ovate or ellipsoid, closely and minutely verrucose, sub-hyaline, 18–27 × 17–21 μ ; epispore hyaline, 1·5–2 μ thick, not infrequently slightly thickened at the apex (2–3 μ).

Host : Elytropappus rhinocerotis Less., Cradock, Cape Province, December, 1913, Mogg [7089] ; Cradock, 14.2.14, Maybugh [7394] ; Roggeveld, Sutherland District, 5.11.17, Skaife [10854] ; Grahamstown, 10.6.19, Mogg [12843].

Distribution : South Africa.

The host, the Rhenoster bosch is common throughout the Cape Province and is becoming a pest, owing to the fact that it takes possession of grazed lands and crowds out all other vegetation.

FELICIA Cass.

7. **Aecidium Woodianum** n. sp.

Aecidia mostly hypophyllous, in small groups on indefinite brown leaf-spots, 3–5 mm. diam., long remaining closed, then open, cupulate, 200–300 μ diam.; margin of the peridium, white, reflexed, incised; cells of the peridium firmly joined together, rhomboid, 30–40 × 13–17 μ, outer wall striate, 6–7 μ thick, inner verruculose 4–5 μ thick. Spores subhyaline, angular-globose to ellipsoid, 16–24 × 13–20 μ; epispore 1·5 μ thick, closely and delicately verruculose.

Host: Felicia sp. (= Diplopappus asper Less), Natal, September, 1881, Medley Wood [10292 and 10293]; Belfast, Transvaal, February, 1909, Doidge [556].

Distribution: Natal and Transvaal.

This is the species which in Medley Wood's collection is labelled Aecidium flustra.

Ae. flustra Berk (Grev. XX, 1892, p. 110), is published by name only without description, and is mentioned as collected in Natal and Valparaiso.

Syd. (Monogr. IV, p. 25), states that the species is not clearly established and that it is doubtful whether the host is an Aster. He gives a description widely differing from the above. Medley Wood's host is certainly the Felicia sp, which is a synonym for Aster asper, but it seems evident that there is no connection between these specimens and Ae. flustra as described in the Monograph. Sydow (Ann. Myc. XVI (1918), p. 241, describes an aecidium on this host, apparently identical with the above, associated on some leaves with Puccinia Feliciae q.v.

Helichrysum Vaill.

8. **Aecidium Helichrysi** n. sp.

Spermogones amphigenous, mostly epiphyllous, in small groups, a few are scattered among the aecidia on the lower surface, at first honey-yellow, later brownish, 100–120 μ diam.

Aecidia hypophyllous on indefinite yellowish leaf-spots, in small groups of 2–6 rarely up to 12, cupulate, with white erect incised margin, 300–400 μ diam; cells of the peridium sub-rhomboid to oblong, 40–50 × 16–20 μ, outer wall striate, 3–3·5 μ thick, inner minutely verruculose, 3–5 μ thick. Spores angular globose to ellipsoid, sub-hyaline, 20–30 × 16–20 μ; epispore hyaline 2·5–3 μ thick, very closely and finely verruculose

Hosts: Helichrysum leiopodium Less., var. denudatum, Lake Chrissie, Transvaal, 29.11.16, Pole Evans [10128]; Carolina District 22.12.07, Burtt-Davy [456]. Helichrysum miconiaefolium DC., Belfast, Transvaal, February, 1909, Doidge [567].

Distribution: Transvaal.

This is possibly the aecidial stage of Puccinia Kalchbrenneri De Toni; No. 456 is on the same leaves as the uredospores of this fungus, but more definite evidence of the connexion is desirable; it is quite distinct from the aecidial stage of P. Mac-Owani.

Metalasia R. Br.

9. **Aecidium Metalasiae** Syd.

in Annal. Myc. X, 1912, p. 35; Monogr. Ured. IV, p. 48.

Aecidia ramicolous, usually producing tumor-like swellings, 1–2 cm. long and 1–5 mm. thick, closely crowded on the tumours, more or less deeply immersed, cylindrical, protruding up to a length of 3 mm., white; margin of the peridium erect, deeply lacerate;

cells of the peridium firmly joined, 35–60 × 18–25 μ, outer wall 6–9 μ thick, striate, inner striately verrucose, 4–6 μ thick. Spores usually ovate or ellipsoid, more rarely angular-globose, sub-hyaline, 20–30 × 15–22 μ; epispore 3·5–4 μ thick, closely and delicately striolate.

Host: Metalasia muricata Less., Lions Head, Capetown, December, 1908, Pole Evans [686].

Nidorella Cass.

30. **Aecidium Nidorellae** n. sp.

Spermogones amphigenous, in small groups, at first honey-yellow, becoming darker with age, 120–140 μ diam.

Aecidia mostly hypophyllous, in groups on round or oval, brown or yellow-brown leaf-spots, up to 12 mm. long, with a tendency to develop in centrifugal circles or following the veins, partly concealed in the tomentum of the leaf, briefly cylindrical, 240–360 μ diam.; margin of the peridium white, reflexed deeply lacerate; cells of the peridium rhomboid, firmly joined together, 30–40 × 16–20 μ, outer wall smooth, 6–7 μ thick, inner delicately verruculose, 2–3 μ thick. Spores sub-hyaline, angular-globose, ovate or ellipsoid, 20–27 × 16–20 μ, epispore about 1·5 μ thick, sometimes slightly thickened at the apex (3 μ), very delicately and closely verruculose.

Host: Nidorella hottentotica D.C. var. lanata Harv., Irene, Pretoria, 6.1.22, Pole Evans [15048].

Osteospermum L.

11. **Aecidium Osteospermi** n. sp.

Amphigenous, but mostly hypophyllous, scattered unevenly over the whole leaf surface, at first briefly cylindrical, closed, up to 0·5 mm. high, 200–250 μ diam.; margin of the peridium white, finally becoming reflexed, incised. Cells of the peridium firmly joined together, sub-rhomboid to oblong, 23–40 × 20–23 μ; outer wall striate, 7–10 μ thick, inner closely and finely verruculose, 4–5 μ thick. Spores angular-globose or oblong, sub-hyaline, 20–29 × 12–19 μ; epispore 2–2·5 μ thick, slightly thicker (3–3·5 μ) at the apex, very delicately verruculose.

Host: Osteospermum moniliferum L., on leaves, lower slopes of Lion's Head, Cape Province, 13.11 12, Saxton [6587].

Senecio (Tourn.) L.

12. **Aecidium incertum** Syd.

in Hedwigia XL, 1901, p. (1); Monogr. Ured. IV, p. 57.

Spermogones epiphyllous, more or less numerous, in groups, at first honey-coloured then brown, 70–110 μ diam.

Aecidia hypophyllous, on round, yellow-brown leaf-spots, 0·5–2 cm. diam., cupulate, about 250 μ diam.; margin of the peridium white, revolute, incised; cells of the peridium firmly joined together, sub-rhomboid to oblong, 20–30 × 15–20 μ, outer wall striate, 4–7 μ thick, inner verrucose, 3–4 μ thick. Spores angular-globose, ovate or ellipsoid, sub-hyaline, 16–19 × 14–17 μ; epispore evenly 1 μ thick, closely and minutely verruculose.

Hosts: Senecio concolor D.C., Bulwer, Natal, 3.11.15, Lansdell [9123].

Senecio laevigatus Thun., Pretoria, 19.12.21, Fuller [15018].

Originally described by Sydow on S. napifolius collected by MacOwan near Somerset East. I have not seen any material of the type collection.

13. **Aecidium anceps** Syd.

in Hedwigia XL, 1901, p. (1); Monogr. Ured. IV, p. 57.

Spermogones epiphyllous, in small groups in the centre of the leaf-spot, at first honey-yellow, then brownish, 80–110 μ diam.

Aecidia hypophyllous, irregularly grouped on round, brown or yellow-brown leaf-spots, about 1 cm. diam., cupulate, about 250 μ diam.; margin of the peridium white, recurved, incised; cells of the peridium oblong, 24–34 × 16–20 μ, outer wall striate, 5–9 μ thick, inner verrucose, 3–4 μ thick. Spores angular-globose, ovate, ellipsoid or oblong, sub-hyaline, 15–19 × 12–16 μ; epispore evenly 1–1·5 μ thick, closely and minutely verruculose.

Hosts: Senecio deltoideus Less, at the foot of the Boschberg Mts., Cape Province, MacOwan.

Senecio quinquelobus DC., Bedford, Cape Province, 29.11.17 Doidge [10891].

Distribution: Cape Province.

Both of the hosts are scandent forms with glabrous, deltoid leaves.

14. **Aecidium dubiosum** Syd.

in Hedwigia XL, 1901, p. (1); Monogr. Ured. IV, p. 59.

Spermogones epiphyllous, in a small group in the centre of the leaf-spot, yellow-brown, 70–100 μ diam.

Aecidia hypophyllous, but occasionally a single one is epiphyllous, on yellow-brown leaf-spots, 0·5–1·5 mm. diam., cupulate, about 200 μ diam.; margin of the peridium revolute, incised; cells of the peridium sub-rhomboid, 26–36 × 18–24 μ; outer wall striate, 6–10 μ thick, inner verrucose, 3–4 μ thick. Spores sub-globose, ovate or oblong, closely and minutely verruculose, sub-hyaline, 18–27 × 15–22 μ; epispore about 1 μ thick, much thicker at the apex (3–10 μ).

Hosts: Senecio mikanoides Otto., Natal, Medley Wood [10309]; Barberton, Transvaal, 20.1.12, Doidge [2010]; Sunday Falls, near Mont aux Sources, 28.12.25, Moore

Senecio tamoides D.C., Inanda, Natal, Medley Wood [828]; Winkle Spruit, Natal, 28.5.15, Medley Wood [9090]; Woodbush, Transvaal, 9.1.25, Doidge [20327].

15. **Aecidium Bylianum** Syd.

in Ann. Myc. XXII (1924), p. 236.

Aecidia amphigenous, chiefly hypophyllous, closely crowded in groups, 3–8 mm. diam. on yellow leaf-spots, cupulate, 250–300 μ diam.; margin of the peridium white, lacerate; cells of the peridium rhomboid, firmly joined together, 22–30 × 14–16 μ, outer wall striate 5–7 μ thick, inner verruculose, 2–3 μ thick. Spores angular-globose, closely and minutely verruculose, 12–17 × 12–14 μ, wall hyaline, barely 1 μ thick.

Host: Senecio pinnulatus Th., Hopefield, Cape Province, October, 1923, van der Bijl 1298.

This species is not represented in the National Herbarium. The host occurs in south-western Cape region.

16. **Aecidium permultum** Syd.

in Ann. Myc. X, 1912, p. 36; Monogr. Ured. IV, p. 58.

Spermogones amphigenous, 100–125 μ diam., at first honey-coloured, then darker, often surrounding the aecidia.

Aecidia amphigenous, but more numerous on the under surface of the leaf, rather closely crowded on round yellow leaf-spots, which are brown in the centre and 1–1·5 cm. diam., briefly cylindrical or cupulate, 200–300 μ diam.; margin of the peridium white,

revolute, incised; cells of the peridium rhomboid, rather loosely connected, 30–38 × 17–24 μ, outer wall striate, 5–7 μ thick, inner 3·5–5 μ thick, closely verrucose Spores angular globose to ellipsoid, very delicately verruculose, sub-hyaline, 15-19 × 12–16 μ; epispore 1–1·5 μ thick.

Host: Senecio serra Sond., Ventersdorp, 21.12.08, Burtt-Davy [750]; Bethal, 1.12.05, Pole Evans [70].

Distribution: Transvaal.

There was an error in the determination of the host of the type collection (750); this is recorded by Sydow (*loc. cit.*) as S. inornatum: it is not this species but S. serra as determined by comparison with named specimens in the Nat. Herb.

Vernonia Schreb.

17. **Aecidium Vernoniae-monocephalae** n. sp.

Aecidia amphigenous and caulicolous, when on the leaves producing indeterminate yellow spots, causing more or less thickening of the stem and midrib of leaf, rather loosely grouped in round or oblong groups, 5–12 mm. long. Aecidia cylindrical, about 1 mm. long and 300–350 μ diam., margin of the peridium white, at first somewhat recurved and slightly incised, peridium finally irregularly lacerate right to the base; cells of the peridium firmly connected, imbricate, rhomboid 40-70 × 20–30 μ, outer wall smooth, 8–10 μ thick, inner wall striately verruculose, 4–5 μ thick. Spores sub-hyaline, sub-globose to ellipsoid, 20–30 × 16–22 μ; epispore hyaline, closely minutely verruculose, 2–2·5 μ thick.

Host: Vernonia monocephala Harv., Kaalfontein, Transvaal, 24.1.17, Pole Evans [10041].

18. **Aecidium Vernoniae-podocomae** n. sp.

Aecidia amphigenous, on small yellow leaf-spots, solitary or in small circular groups, up to 2 mm. diam., pale yellow, waxy, long remaining closed, finally flask shaped, with a short narrow open neck, 200–250 μ diam.; margin of the peridium white, somewhat recurved and incised; cells of the peridium rhomboid, 20–30 × 13–20 μ, outer wall faintly striate, 4–5 μ thick, inner verruculose, about 3 μ thick. Spores sub-globose or ellipsoid, angular, sub-hyaline, 17–27 × 15–23 μ; epispore 2·5–3 μ thick, closely and delicately verruculose.

Host: Vernonia podocoma Sch. Bip., Lemana, Northern Transvaal, 20.8.08, Pole Evans [498]; Barberton, 4.2.11, Pole Evans [466]; New Agatha, Northern Transvaal, 7.8.11, Doidge [1820]; Barberton, 29.8.11, Pole Evans [1857].

Distribution: Transvaal.

The host extends from Abyssinia to the Northern Transvaal. This species is distinguished from Aecidium Vanderystjanum P. Henn. on Vernonia sp. from the Congo, chiefly by the thicker-walled spores.

Species parasitic on **Dipsaceae.**

19. **Aecidium Cephalariae** Syd.

in Ann. Myc. X, 1912, p. 5; Monogr. Ured. IV, p. 69.

Aecidia hypophyllous, in more or less closely crowded groups, on yellow or yellow-brown leaf-spots, 1–1·5 cm. diam., briefly cylindrical, about 250 μ diam., margin of the peridium white, incised; cells of the peridium rhomboid, 25–38 × 17–24 μ; outer wall striate, 6–8 μ thick; inner striate-verrucose, 3–5 μ thick. Spores globose, ovate or broadly

ellipsoid, closely and delicately verruculose, sub-hyaline, 19–24 × 16–21 μ; epispore 1·5 μ thick.

Host: Cephalaria ustulata R. and Sch., Pretoria, 26 12.07 and 12.12 19, Pole Evans [475 and 12836].

Species parasitic on **Rubiaceae.**

Ancylanthus Desf.

20. **Aecidium Ancylanthi** P. Henn.

in Bot. Ergebnisse der Kunene-Sambesi Exped. Berlin, 1903, p. 161; Syd. Monogr. Ured. II, p. 73.

Aecidia hypophyllous on round yellow or yellow-brown spots, up to 1 cm. diam., arranged in irregualr circles, often following the nerves, cylindrical, up to 0·5 mm. long and about 200 μ diam., margin of the peridium almost erect, denticulate; cells of the peridium firmly joined together, 22–30 × 16–24 μ. Spores angular-globose, ellipsoid or oblong, sub-hyaline, 17–25 × 15–18 μ; epispore 1–1·5 μ thick, at the apex 3–9 μ thick, closely and minutely verruculose.

Host: Ancylanthus fulgidus Welw., near Habungu R., Baum.
This species is not represented in the National Herbarium.

Hedyotis L.

21. **Aecidium pretoriense** n. sp.

Aecidia hypophyllous usually in 2 rows on either side on the midrib, white, cylindrical, about 1 mm. long, 350–400 μ diam.; margin of the peridium at first incurved and closed, later reflexed and becoming rather deeply laciniate; cells of the peridium firmly connected, rhomboid to polygonal, 40–50 × 16–24 μ, outer wall faintly striate, 4–5 μ thick, inner wall verrucose, 3–4 μ thick. Spores oblong, ellipsoid or angular-globose, sub-hyaline, 20–33 × 13–23 μ; epispore closely and delicately verruculose, 2·5–3 μ thick, occasionally slightly thickened at the apex (up to 5 μ).

Host: Hedyotis amatymbica Hochst., Groenkloof, Pretoria, 12.12.19, and 23.11.21, Pole Evans [12521 and 15043]; Garstfontein, Pretoria District, 6.12.11, Pienaar [1947].

The above species differs from Aecidium Hedyotidis Syd. and Ae. Wildemanianum Syd. in the cylindrical aecidia and larger spores with thicker epispore

Kraussia Harv.

22. **Aecidium Kraussiae** Syd.

Monogr. Ured. IV, p. 19, 1924.

Aecidia hypophyllous, on brown or reddish-brown leaf spots, regularly arranged in concentric circles, 2–10 mm. diam., briefly cylindrical, 250–300 μ diam.; margin of the peridium white, denticulate; cells of the peridium firmly joined together, imbricately placed, 26–36 × 18–24 μ, outer wall striate, 4–5 μ thick, inner wall verruculose, 3–4 μ thick. Spores angular-globose or ellipsoid, sub-hyaline, 22–27 × 18–22 μ, epispore 1·5 μ thick, closely and minutely verruculose.

Host: Kraussia floribunda Harv., Inanda, Natal, May, 1876, Medley Wood [10324, 819 and 358 and 10278]; Verulam, Natal, 14.6.80, Medley Wood 21 [13084]; Stella Bush, Durban, 11.7.11, Doidge [1668]; Amanzimtoti, Natal, 10.7.11, Doidge [1669]; Winkle Spruit, 5.6.12, Pole Evans [2392]; Umgeni Beach, Durban, 7.7.12, Doidge [2527]; Verulam, 3.7.13, Pole Evans [6802]; Isipingo, 13.5.13, Doidge [6645]; Tongaat, 12.9.13, Van der Byl [6948].

Pachystigma Hochst.

23. **Aecidium Pachystigmae** n. sp.

Aecidia amphigenous, but mostly hypophyllous, in rather sparse groups up to 25 mm. diam., on indefinite brown leaf-spots, cupulate, 240–300 μ diam.; margin of the peridium reflexed, white, incised; cells of the peridium rhomboid, 30–40 × 16–20 μ, outer wall striate, 8–10 μ thick, inner verrucose, 3–4 μ thick. Spores sub-hyaline, angular-globose, ovate or broadly ellipsoid, 17–25 × 15–19 μ; epispore very delicately and closely verruculose, about 1·5 μ thick, often thickened at the apex (up to 5 μ).

Host: Pachystigma Zeyheri Sond., Hennops River, Pretoria District, 5.1.11, Pole Evans [1063]; Kaapmuiden, 16.4.14, Wager [7731]; Olifantsfontein, 11.2.20, Pienaar [12818]; Lichtenburg, 17,1.26, Liebenberg [20671].

Pavetta L.

24. **Aecidium Transvaaliae** P. Henn. et Evans.

in Engl. Bot. Jahrb. XLI, 1908, p. 272; Syd. Monogr. Ured. IV, p. 82.

Spermogones epiphyllous, fairly numerous, in groups, reddish-brown, about 100–130 μ diam.

Aecidia hypophyllous, closely crowded on reddish-yellow spots, about 1 cm. diam., cupulate, 250–300 μ diam.; margin of the peridium white, rather broadly laciniate and strongly revolute; cells of the peridium sub-rhomboid, 32–42 × 17–22 μ; outer wall striate, 4–6 μ thick; inner verrucose 3·5–4 μ thick. Spores angular-globose or ellipsoid, sub-hyaline, 21–26 × 18–22 μ; epispore 1–1·5 μ thick, closely and minutely verruculose.

Host: Pavetta spp., White River, Transvaal, January, 1906, Burtt Davy [87]; Salisbury, January, 1920, Eyles [14013].

25. **Aecidium Pienaarii** n. sp.

Aecidia closely crowded on the berries, often covering the entire surface of the fruit, immersed and long remaining closed, later open, cupulate 200–250 μ diam.; margin of the peridium white, denticulate: cells of the peridium in regular series, imbricate, firmly joined together, rhomboid to quadratic, 22–30 × 16–22 μ; outer wall striate, 4–5 μ thick, inner verruculose 3–4 μ thick. Spores sub-hyaline, angular globose, oblong or ellipsoid, 16–24 × 15–17 μ; epispore 1–1·5 μ thick, very delicately and closely verruculose.

Host: Pavetta asimilis Sond., Garstfontein, Pretoria District, 25.3.11, Pienaar [1259].

Plectronia L.

26. **Aecidium Baumianum** P. Henn.

in Bot. Ergebnisse der Kunene-Sambesi Exped. Berlin, 1903, p. 163; Syd. Monogr. Ured. IV, p. 83.

Aecidia hypophyllous, arranged in circles on brownish circular leaf-spots, 3–5 mm. diam., an occasional one is also epiphyllous, briefly cylindrical, 250–300 μ diam; margin of the peridium, white, revolute, lacerate; cells of the peridium arranged in fairly regular rows, firmly joined, rhomboid, 22–32 × 16.22 μ; outer wall striate, 4–6 μ thick, inner verrucose, 3–4 μ thick. Spores angular-globose, ovate or oblong, sub-hyaline, 17–26 × 13–18 μ; epispore 1–1·5 μ thick, thicker at the apex (2–5 μ), very delicately and closely verruculose.

Host: Plectronia abbreviata, near Habungu River, 28.12.99, Baum [6384].

27. **Aecidium Plectroniae** Cke.

in Grevillea X, 1882, p. 124; Syd. Monogr. Ured. IV, p. 83.

Spermogones epiphyllous, in small irregular groups, yellow-brown, about 150 μ diam. Aecidia hypophyllous in small irregular groups, on round yellow-brown leaf-spots, 3–5 mm. diam., cupulate, about 200 μ diam; margin of the peridum white, slightly denticulate. Cells of the peridium firmly joined together, arranged in regular rows, 30–35 μ long, outer wall striate, 6–8 μ thick, inner verrucose, 2·5–3 μ thick. Spores globose, subglobose or ovate, sub-hyaline, 23–25 × 19–21 μ; epispore about 1·5 μ thick, often thicker at the apex (up to 5 μ), closely verruculose.

Hosts: Plectronia Gueinzii Sond., Natal, Medley Wood, [10304, 10305, and 10306]. Plectronia Mundtiana Pappe, New Agatha, Northern Transvaal, August, 17, Pole Evans [11030].

28. **Aecidium plectroniicola** P. Henn.

in Bot. Ergebnisse der Kunene-Sambesi. Exped. Berlin, p. 162; Syd. Monogr. Ured. IV, p. 82.

Aecidia hypophyllous closely crowded on minute, round brown spots, 2–3 mm. diam., briefly cylindrical, 250–300 μ diam.; margin of the peridium reflexed, incised. Cells of the peridium sub-rhomboid, rather loosely connected, 19–26 × 17–22 μ, outer wall delicately striate, 4–5 μ thick, inner aculeately verrucose, about 3 μ thick. Spores sub-globose, ovate or ellipsoid, sub-hyaline, 20–26 × 17–23 μ; epispore uniformly 1·5–2 μ thick, closely and minutely verruculose.

Host: Plectronia huillensis, near Napalanka, Longa River.

I have not seen this rust, which is not represented in the National Herbarium.

Vangueria Juss.

29. **Aecidium Vangueriae** Cke.

in Grevillea X, 1882, p. 124; Syd. Monogr. Ured. IV, p. 89.

Syn. *Aecidium Vangueriae* Cke., var. *tumefaciens* P. Henn. in A. Engler, Die Pflanzenwelt Ostafrikas und der Nachbergebiete Teil C, p. 53.

Aecidia hypophyllous or on the stems peduncles and fruits, either more or less closely crowded in groups of varying size, and then producing yellow or yellow-brown spots on the upper surface of the leaf, or irregularly and more or less evenly covering the whole of the under surface of the leaf; occasionally (form tumefaciens) causing distortion of the host, and causing varying degree of thickening of the veins of the leaves or the peduncles and fruits, cylindrical, up to 1·5 mm. long, about 250 μ diam., margin of the peridium white, revolute, denticulate. Cells of the peridium in regular lines, firmly connected, rhomboid, 22–27 × 16–20 μ, outer wall striate, 4–7 μ thick, inner verrucose, about 3 μ thick. Spores angular-globose, ellipsoid or oblong, sub-hyaline 17–26 × 12–18 μ; epispore 1–2 μ thick, not thickened at the apex, or more or less thickened (up to 7 μ), minutely verruculose.

Hosts: Vangueria infausta Burch., Inanda, Natal, March, 1881, Medley Wood [10317 and 10318]; Durban, 14.5.97, Medley Wood [338 and 11214]; Magoeba's Kloof, Northern Transvaal, 12.6.06, Burtt-Davy [136 and 180]; Silverton, near Pretoria, 16.5.10, Doidge [919]; Garstfontein, Pretoria District, 12.2.11, Pienaar [1204]; Amanzimtoti, Natal, 10.7.11, Doidge [1657]; Isipingo, Natal, 13.5.13, Doidge [6637]; Garstfontein, Pretoria District, 20.5.13, Erasmus [6651]; Scottsburgh, Natal, 5.7.13, Pole Evans [6838]; Silverton, near Pretoria, 29.3.15, Howlett [8972]; Edendal, Pretoria District, 13.5.18, Lounsbury [11371]; Nyamandhlovu, Rhodesia, December, 1920, Eyles [15519].

Vangueria latifolia Sond., Scottsburgh, Natal, 5.7.13, Pole Evans [6832].

Distribution: South and Central Africa, East India.

In addition to the hosts mentioned above, this aecidium has been recorded from Africa on Vangueria edulis.

Species parasitic on **Acanthaceae.**

30. **Aecidium Acanthacearum** Cke.

in Grevillea X, 1882, p. 124; Syd. Monogr. Ured. IV, p. 94.

Aecidia hypophyllous on yellow leaf-spots, in round or elongated groups, 3–5 mm. long, cupulate, 250–300 μ diam.; margin of the peridium white, denticulate; cells of the peridium firmly joined together, sub-rhomboid, 20–30 × 15–20 μ; outer wall striate, 4–6 μ thick, inner verruculose 2–3 μ thick. Spores angular-globose or ellipsoid, sub-hyaline, 16–21 × 15–18 μ; epispore 1 μ thick, closely and delicately verruculose.

Hosts: Chaetacanthus Burchellii Nees (= Calophanes Burkei), Inanda, Natal, September, 1881, Medley Wood [10275 and 10277].

Isoglossa Eckloniana Lindau, Barberton, 4.2.11, Pole Evans [1163].

Isoglossa Woodii C.B.Cl., Barberton, Transvaal, 20.1.12, Doidge [2016].

Isoglossa spp., Groenkloof, Pretoria District, 7.2.14, Mogg [7407]; Woodbush, Northern Transvaal, 9.1.15, Doidge [20328].

Species parasitic on **Solanaceae.**

31. **Aecidium habunguense** P. Henn.

in Bot. Ergebnisse der Kunene-Sambesi. Exped., 1903, p. 160 (ex errore sub-Aec. habunguensis).

Syd. Monog. Ured. IV, p. 108.

Spermogones epiphyllous, closely crowded on the centre of the spot, at first honey-yellow then brown, 100–130 μ diam.

Aecidia hypophyllous closely crowded on round leaf-spots 3–6 mm. diam., which are olive-brown, yellow, or brown above, and yellow or green beneath; aecidia briefly cylindrical, 250–300 μ diam.; margin of the peridium white, revolute, denticulate; cells of the peridium rhomboid, 22–26 × 18–22 μ, outer wall very delicately striate, 5–7 μ thick, inner verrucose 2–3 μ thick. Spores angular-globose or ellipsoid, subhyaline, 18–22 × 15–18 μ; epispore 1 μ thick very delicately verruculose, almost punctate.

Hosts: Solanum incanum L., Springbok Flats, Transvaal, 26.11.09, Burtt-Davy [941]; Garstfontein, Pretoria District, 4.12.11, Pienaar [1959].

Solanum indicum L., Gazaland, South Rhodesia, 1.9.17, Swynnerton [10711].

Solanum panduraeforme E. Mey., Heidelberg District, 25.2.06, Burtt-Davy [253]; Witfontein, Rustenburg District, 9.11.07, Thomsen [726]; Garstfontein, Pretoria District, 19.2.11, 8.4.11, and 20.1.13, Pienaar [1215, 1381 and 6584].

Solanum supinum Dun., Lichtenburg District, 23.12.10, Pienaar [1049].

Originally described on Solanum Baumii.

Species parasitic on **Labiatae.**

32. **Aecidium Plectranthi** Barcl.

in Jour. of the Asiatic Soc. of Bengal LIX, Part II, 1890, p. 104; Syd. Monogr. Ured. IV, p. 113.

Spermogones epiphyllous fairly numerous, honey-yellow, 100–125 μ diam.

Aecidia hypophyllous on yellow-brown leaf-spots, in small closely crowded groups, 1–3 mm. diam., 200–250 μ diam., cupulate, margin of the peridium white, revolute, lacerate; cells of the peridium firmly joined together, rhomboid to polygonal, 24–35 × 16–23 μ; outer wall faintly striate, 6–7 μ thick, inner verruculose 3–4 μ thick. Spores somewhat angular, sub-globose or ellipsoid, 20–26 × 17–23 μ, sub-hyaline; epispore delicately verruculose, wall 1–1·5 μ thick.

Host: Plectranthus sp., Westfalia, Duivelskloof, Northern Transvaal, 9.1.25 Doidge [20330]; Salisbury, Rhodesia, January, 1920, Eyles [14012].

Distribution: South Africa, East India, Japan.

33. **Aecidium Pycnostachydis** (Kalch), comb. nov.

Syn. *Uredo Pycnostachydis* Kalch. in Grev. XI, 1882, p. 25.

Aecidia hypophyllous, on inconspicuous leaf-spots, most frequently solitary, briefly cylindrical, about 500 μ high and 300–350 μ diam.; margin of the peridium white, lacerate; cells of the peridium firmly joined together, oblong or rhomboid, 50–70 × 20–30 μ, as seen in the flat, with finely verrucose walls, 2–4 μ thick. Spores irregular, usually ellipsoid or elongated, closely set with short thick warts, which easily become detached, 26–36 × 19–24 μ; walls hyaline, 1–1·5 μ thick.

Host: Pychnostachys reticulata Benth., Inanda, Natal, Medley Wood 30 [10594 and 11222].

Pychnostachys purpurascens Briq., Lydenburg, Burtt Davy [437].

Sydow has pointed out (Monogr. Ured. IV, p. 567) that the fungus described as Uredo Pycnostachydis is a typical aecidium, and has also given a detailed description of the fungus.

Species parasitic on **Verbenaceae.**

34. **Aecidium Evansii** P. Henn.

in Engl. Bot. Jahrb. XLI, 1908, p. 272; Syd. Monogr. Ured. IV, p. 117.

Aecidia mostly hypophyllous, but there are often also a few on the upper leaf surface, grouped on yellow-brown leaf-spots up to 5 mm. diam., which are round or somewhat elongated along the veins. Aecidia cupulate, about 250 μ diam., white; margin of the peridium denticulate, slightly reflexed; cells of the peridium firmly joined together, rhomboid, 24–32 × 17–32 μ, outer wall striate, 6–7 μ thick, inner closely verruculose, 3–4 μ thick. Spores almost always angular, sub-hyaline, 20–28 × 17–23 μ; epispore 2 μ thick, slightly thicker at the apex (3–5 μ), closely verruculose.

Hosts: Lippia asperifolia Rich., Wonderboom, Pretoria District, 30.3.06, Pole Evans [33]; Pretoria, 1907, Pole Evans [67]; Pretoria, 26.12.07, Burtt Davy [706]; The Willows, Pretoria District, 23.11.12 and 11.1.13, Pole Evans [5186 and 5591]; Gazaland, Southern Rhodesia, 11.9.17, Swynnerton [10714].

Lippia scaberrima Sond., Lichtenburg District, 1.1.11, Pienaar [1054].

Species parasitic on **Boraginaceae.**

35. **Aecidium Davyi** Syd.

in Ann. Myc. X, 1912, p. 35; Monogr. Ured. IV. p. 121.

Aecidia hypophyllous on round, yellow or yellow-brown leaf-spots, closely crowded in groups, 2–6 mm. diam., often developing centrifugally in circles, cupulate, yellow, about 250 μ diam.; margin of the peridium revolute, somewhat incised; cells of the peridium loosely connected, 22–34 × 18–24 μ, outer wall smooth, 5–7 μ thick, inner wall rather coarsely connected, 22–34 × 18–24 μ, outer wall smooth, 5–7 μ thick, inner wall rather coarsely verrucose, 3–5 μ thick. Spores globose, ovate or angular-globose, sub-hyaline, 14–16 × 12–14 μ; epispore 1–1·5 μ thick, very delicately verruculose.

Hosts: Cynoglossum micranthum Desf., Inanda, Natal, 17.9.1881, Medley Wood [10280 and 350]; Lydenburg, Transvaal, 4.12.07, Burtt Davy [465]; Skinner's Court, Pretoria, October, 1910, Pole Evans [1010].

Cynoglossum grande Dougl., Modderspruit, Zoutpansberg District, 21.10.09 [694].

Species parasitic on **Loganiaceae.**

36. **Aecidium Gomphostigmae.**

Spermogones epiphyllous, scattered, rather numerous, brown, 150–200 μ diam.

Aecidia mostly hypophyllous, only an occasional one being epiphyllous, rather closely and more or less evenly distributed over the whole leaf surface, ochre-yellow, long remaining closed, but finally open, cupulate, 250–300 μ diam., margin of the peridium yellowish, not recurved, incised. Cells of the peridium firmly joined together, rhomboid to oblong, imbricate, 30–50 × 16–20 μ, outer wall striate, 6–7 μ thick, inner verrucose, 3–4 μ thick. Spores sub-hyaline, angular-globose to ellipsoid, 20–35 × 16–20 μ, epispore delicately and closely verruculose, 2–2·5 μ thick, sometimes thickened at the apex (up to 6 μ).

Host: Gomphostigma scoparoides Turcz., Bushmans River Valley, 21.10.07 Medley Wood [838].

Species parasitic on **Ebenaceae.**

37. **Aecidium bicolor** Sacc.

in Syll. Fung. XIV, p. 899, p. 385; Syd. Monogr. Ured. IV, p. 148.

Spermogones epiphyllous, very freely produced, irregularly grouped, black, shining, 250–350 μ diam.

Aecidia hypophyllous, leaf-spots not formed or inconspicuous, scattered, often covering the greater part of the leaf, round, 400–800 μ diam., long covered by the blackened epidermis, which later becomes ruptured and stands erect surrounding the aecidium; margin of the peridium very delicate, white, incised; cells of the peridium rhomboid, 24–35 × 18–25 μ, outer wall 6–9 μ thick, striate, inner verrucose, 4–5 μ thick. Spores angular-globose or oblong, often square, 25–30 × 18–22 μ; epispore yellowish, 2–2·5 μ thick, closely verruculose.

Host: Maba natalensis Harv., near Durban, Natal, 14.5.1897, Medley Wood [336 and 11195].

38. **Aecidium Royenae** Cke. et Mass.

in Grevillea XVII, 1889, p. 70; Syd. Monogr. Ured. IV, p. 149.

Syn. *Aecidium Welwitschiae* Lagh. in Bol. da Soc. Brot. VII, p. 134 (1889).

Aecidium hypophyllous, equally distributed over the whole leaf surface, also occurs sparingly on stems and petioles, cylindrical, 500–800 μ long, 400–500 μ diam.; margin of the peridium lacerate, erect or somewhat revolute; cells of the peridium firmly joined together, rhomboid, 23–30 × 20–25 μ; outer wall striate, 6–10 μ thick, inner coarsely verrucose, about 4 μ thick. Spores angular-globose, ellipsoid or oblong, sub-hyaline, 18–25 × 13–19 μ; epispore 1 μ thick, closely and minutely verruculose.

Hosts: Royena pallens Thun., near Durban, 13.10.188, Medley Wood [327 and 792]; Rikatli, Portuguese East Africa, 31.5.18, Junod [11683]; Salisbury, Rhodesia, November, 1921, Eyles [15521].

Royena villosa L., Tzaneen, Northern Transvaal, June, 1906, Pole Evans [171].

Species parasitic on **Umbelliferae.**

39. **Aecidium albilabrum** Kalch.

in Flora LIX, 1876, p. 363; Syd. Monogr. Ured. IV, p. 151.

Aecidia amphigenous, on minute round brown spots, solitary or in small irregular groups, cupulate, 200–250 μ diam.; margin of the peridium white, lacerate, revolute; cells of

the peridium irregularly rectangular, 26–32 × 20–24 μ, outer wall smooth, 6–9 μ thick, inner rather coarsely aculeate-verrucose, 3–4·5 μ thick. Spores ellipsoid or ovate, often angular, sub-hyaline, 20–30 × 18–24 μ; epispore 1·5 μ thick, closely and minutely verruculose.

Hosts: Alepidea serrata E. and Z., between Jamestown and Dordrecht, Transvaal, 13.1.12, Doidge [2018].

Originally collected by MacOwan on Alepidea ciliaris and A. amatymbica.

Species parasitic on **Araliaceae.**

40. **Aecidium Cussoniae** Kalch.

in Grevillea X, 1882, p. 123; Syd. Monogr. Ured. IV, p. 159.

Spermogones epiphyllous, irregularly grouped, 100–130 μ diam., at first honey-yellow, then darker.

Aecidia hypophyllous or amphigenous, often following the nerves, on brown leaf-spots which are often somewhat bullate, closely crowded in groups up to 2 cm. long, cupulate, 300–400 μ diam.; margin of the peridium recurved, incised; cells of the peridium firmly joined together, overlapping, 25–35 × 17–20 μ. Spores globose, ellipsoid or angular, sub-hyaline, 14–18 × 12–16 μ; epispore 1 μ thick; closely and minutely verruculose.

Host: Cussonia spicata Thun., Inanda, Natal, Medley Wood 88 [10026 and 10287].

Species parasitic on **Malvaceae.**

41. **Aecidium Garckeanum** P. Henn.

in Engl. Bot. Jahrb. XIV, 1891, p. 372; Syd. Monogr. Ured. IV, p. 172.

Syn. *Aecidium Hibisci* Cke. in Grevillea XX, p. 110 (1892).

Aecidium hypophyllous, closely crowded on yellow or brown leaf-spots, 2–8 mm. diam., briefly cylindrical, about 200–250 μ diam.; margin of the peridium white, lacerate, revolute; cells of the peridium firmly joined together, rhomboid, 22–26 × 17–19 μ, outer wall striate, 3–5 μ thick, inner wall verruculose, 2–2·5 μ thick. Spores globose or ellipsoid, sub-hyaline, 16–22 × 12–17 μ; epispore 1 μ thick, almost smooth.

Host: Hibiscus cannabinus L., Barberton, Transvaal, 20.4.14, Mogg [7809] and 27.4.18, Lansdell [11666].

Distribution: South and Central Africa.

Species parasitic on **Vitaceae.**

42. **Aecidium Vitis** A. L. Smith.

in Journ. of Bot. XXXIII, 1895, p. 432; Syd. Monogr. Ured. IV, p. 176.

Spermogones epiphyllous, in groups, brown, about 100 μ diam.

Aecidia hypophyllous, more rarely epiphyllous, on round or irregular leaf-spots, which are yellow-brown and slightly thickened, closely placed in groups, 3–6 mm. diam., cupulate, about 300 μ diam.; margin of the peridium white, lacerate; cells of the peridium sub-quadratic or rectangular, 23–30 × 17–20 μ, outer wall striate, 5–7 μ thick, inner verrucose, 4–5 μ thick. Spores globose, sub-globose or broadly ellipsoid, hyaline, 20–25 × 18–22 μ, epispore 1 μ thick, closely and minutely verruculose.

Host: Vitis sp., Macheke, Rhodesia, December, 1919, Eyles [14001].

Species parasitic on **Balsaminaceae.**

43. **Aecidium Impatientis-capensis** n. sp.

Spermogones epiphyllous, in small groups, or scattered, at first honey-yellow, then darker, 100–120 μ diam.

Aecidia hypophyllous on round leaf-spots, up to 10 mm. diam., these show yellow-brown on the upper surface, and pale, almost white, on the lower; aecidia usually arranged in a circle, which is up to 6 mm. diam., cupulate, yellow, 240–320 μ diam., margin of the peridium erect, incised; cells of the peridium firmly joined together, imbricate, rhomboid, with incurved apices, 40–50 × 18–22 μ, outer wall finely striate, 9–10 μ thick inner 4–5 μ thick, verruculose. Spores sub-hyaline, angular-globose to ellipsoid, 20–72 × 16–18 μ; epispore 1·5–2 μ thick, very closely and delicately verruculose.

Host: Impatiens capensis Thun., Edendale, Natal, 26.12.11, Doidge [1990].

Species parasitic on **Sapindaceae.**

44. **Aecidium Cardiospermi** Cke.

in Grevillea X, p. 125 (1882); Syd. Monogr. Ured. IV, p. 179.

Aecidia hypophyllous, closely crowded on yellow or yellow-brown leaf-spots, 2–5 mm. diam., long remaining closed, finally cupulate, very minute, 100–200 μ diam., yellow; margin of the peridium somewhat revolute and slightly incised; cells of the peridium very minute, 20–25 μ long. Spores angular-globose, sub-hyaline, 16–22 × 13–17 μ; epispore 1–1·5 μ thick, very delicately verruculose.

Host: Cardiospermmum Halicacaba L., Natal, Medley Wood [10282 and 10283].

Species parasitic on **Euphorbiaceae.**

Acalypha L.

45. **Aecidium acalyphicolum** Doidge.

Sub *Puccinia Evansii* P. Henn. in Engl. Bot. Jahrb. XLI (1908), p. 271.

Aecidia amphigenous and caulicolous in groups on reddish-brown or brown spots which are elongated up to 1 cm. in length, often causing more or less distortion and hypertrophy. Aecidia yellow, semi-immersed, cupulate, 400–500 μ diam.; margin of the peridium white, somewhat recurved, laciniate; cells of the peridium oblong to polyhedral, 15–27 × 10–20 μ, outer wall smooth, 6–7 μ thick, inner wall verruculose, 3–4 μ thick. Spores sub-globose to ellipsoid, usually angular, pale yellow, 15–25 × 12–20 μ, epispore about 1 μ thick, very delicately verruculose.

Hosts: Acalypha spp., The Willows, Pretoria District, 24.11.06 [207 and 208]; Marico District., 12.11.07, Burtt-Davy [705]; Haenertsburg, Northern Transvaal, December, 1907, Ord Brown [442]; Middelbult, Lichtenburg District, 3.1.11, Pienaar [1060]; Garstfontein, Pretoria District, 20.12.11, Pienaar [1981].

Distribution: Transvaal.

Compare Puccinia Evansii.

Cluytia Linn.

46. **Aecidium Cluytiae** n. sp.

Spermogones mostly hypophyllous, scattered among the aecidia, honey-yellow, becoming darker with age, 140–150 μ diam.

Aecidia hypophyllous, numerous, covering the entire leaf surface and causing a reddish discoloration of the tissues, immersed, cupulate, 300–400 μ diam.; margin of the peridium slightly recurved, incised; cells of the peridium firmly joined together, rhomboid, 25–35 × 20–25 μ, outer wall striate, 6–7 μ thick, inner verrucose 4–5 μ thick. Spores angular globose to ellipsoid, sub-hyaline, 16–22 × 15–17 μ; epispore very delicately verruculose, 2–2·5 μ thick.

Host: Cluytia virgata Bax., Belfast, Transvaal, 4.10.13, Doidge [6968].

Euphorbia L.

47. **Aecidium kakelense** P. Henn.

in Bot. Ergebnisse der Kunene-Sambesi. Exped. Berlin, 1903, p. 116; Syd. Monogr. Ured. IV, p. 189.

Aecidia hypophyllous, the infected leaves showing a red discoloration on the upper surface, closely and evenly distributed over the whole leaf surface, cylindrical, 400–700 μ long, about 250 μ diam.; margin of the peridium white, somewhat reflexed, incised; cells of the peridium firmly joined together, sub-rhomboid, 22–30 × 18–24 μ, outer wall deeply striate, 6–8 μ thick, inner densely verrucose, about 3 μ thick. Spores angular-globose, ovate or ellipsoid, 18–24 × 16–20 μ, epispore 1·5 μ thick, closely and minutely verruculose.

Host: Euphorbia sp. (with small leaves about 1 cm. long), near Kakele, Baum.

I have not seen this species.

38. **Aecidium Pottsii** n. sp.

Spermogones epiphyllous, grouped near the mid-rib of the leaf or amphigenous and scattered among the aecidia, honey-yellow, becoming brown with age, 120–150 μ diam.

Aecidia hypophyllous, evenly distributed over the whole leaf surface (one or two occasionally occur on the upper surface), all the upper leaves of the plant being usually affected and somewhat discoloured. Aecidia briefly cylindrical, immersed, 0·4–0·7 mm. long, 300–400 μ diam.; margin of the peridium white, revolute, lacerate; cells of the peridium firmly joined together, in regular series, sub-rhomboid to polygonal, imbricate, 30–40 × 16–20 μ, outer wall striate, 9–10 μ thick, inner verrucose 4–5 μ thick. Spores sub-hyaline, angular globose to ellipsoid, 17–23 × 13–20 μ; epispore 1·5–2 μ thick, very delicately and closely verruculose.

Hosts: Euphorbia mauretanica L., Bloemfontein, Orange Free State, November, 1916, Potts [11315].

Fluggea Willd.

49. **Aecidium Fluggeae** n. sp.

Aecidia hypophyllous, distributed evenly over the whole leaf surface, or the greater part of it, cylindrical, up to 1 mm. long, 200–300 μ diam.; margin of the peridium white, revolute, deeply lacerate and early becoming torn away; cells of the peridium firmly joined together, in regular series, rhomboid to rectangular, 23–30 × 10–20 μ, outer wall smooth 6–7 μ thick, inner verruculose, 3–4 μ thick. Spores sub-hyaline, angular-globose to ellipsoid 16–24 × 12–17 μ; epispore very delicately verruculose, about 1 μ thick.

Host: Fluggea microcarpa Blume, Buffelspan, Pillandsberg, 24.12.21, Pole Evans [17298].

Species parasitic on **Leguminosae.**

Crotalaria Linn.

50. **Aecidium Dielsii** P. Henn.

in Engl. Bot. Jahrb. XXXIII, 1902, p. 34; Syd. Monogr. Ured. IV, p. 214.

Aecidia amphigenous, rather loosely grouped or closely crowded, irregularly placed, 400–500 μ diam.; peridia exserted, 1–2 mm. long, and slit right to the base into narrow segments; cells of the peridium loosely connected, elongated, 42–60 × 11–20 μ, outer wall striate, 3–5 μ thick, inner minutely verruculose, 1·5–2 μ thick. Spores globose, subglobose or ellipsoid, closely verruculose, sub-hyaline, 22–27 × 18–24 μ; epispore 2–3 μ thick.

Host: Crotalaria sp., Cape Province (Diels, Engler).
Not represented in the National Herbarium.

Lebeckia Thunb.

51. **Aecidium Lebeckiae** P. Henn.

in Hedwigia XXXVII, 1898, p. 294; Syd. Monogr. Ured. IV, p. 216.

Spermogones amphigenous, fairly numerous, in groups, brown, 100–130 μ diam.

Aecidia amphigenous, in a ring surrounding the spermogones, briefly cylindrical, up to 0·5 mm. long, 250–300 μ broad; margin of the peridium white, sub-erect or slightly recurved, laciniate; cells of the peridium loosely connected, 20–26 μ long, outer wall striate, very strongly thickened (20–25 μ) inner verruculose, 2–3 μ thick. Spores angular-globose, ovate or ellipsoid, sub-hyaline, 15–20 × 13–17 μ; epispore 2·5–3·5 μ thick, very delicately verruculose or punctate.

Host: Lebeckia Simsiana E. and Z., near Windhoek, South-West Africa, Schlechter.
I have not seen this species.

Lonchocarpus H.B.K.

52. **Aecidium Menyharthi** P. Henn.

in Bull. Herb. Boiss. VI, 1906, p. 702; Syd. Monogr. Ured. IV, p. 217.

Aecidia hypophyllous, on indefinite yellow leaf-spots; loosely grouped in round or irregular groups, up to 700 μ long, about 250 μ diam.; margin of the peridium erect, white, hardly lacerate; cells of the peridium firmly joined together, rhomboid, 18–25 × 11–15 μ, outer wall smooth, 4–5 μ thick, inner minutely verruculose, 1·5–2 μ thick. Spores variable, sub-globose, angular, ellipsoid or oblong, sub-hyaline, 15–20 × 9–15 μ; epispore barely 1 μ thick, closely and delicately verruculose or almost punctate.

Host: Lonchocarpus sp., Boroma, in the Zambesi region, (Menyharth).
Not represented in the National Herbarium.

Melilobium E. et Z.

53. **Aecidium australe** Berk.

in Hooker's London Journ. of Bot. II, 1843, p. 523; Syd. Monogr. Ured. IV, p. 217.

Aecidia amphigenous, occupying the whole leaf surface, deeply immersed, peridium exserted up to 1 mm. long, cut to the base into many narrow segments. Cells of the peridum firmly joined together, oblong, 35–50 × 10–12 μ. Spores globose, sub-globose or broadly ellipsoid, yellow, 25–34 × 24–30 μ; epispore 1·5 μ thick, densely verruculose.

Host: Melilobium sp., Uitenhage, Cape Province.
I have not seen this species.

Rafnia Thun.

54. **Aecidium resinaecolum** (Rud.) Wint.

in Flora LXVII, 1884, p. 264; Syd. Monogr. Ured. IV, p. 220.

Syn. *Caeoma* (*Aecidium*) *resinaecola* Rud. in Linnaea IV, p. 389 (1829).
Aecidium Rafniae MacOwan in Sched.

Spermogones amphigenous, distributed among the aecidia, honey-coloured to brown, or when old, darker, 110–150 μ diam.

Aecidia amphigenous or on the younger branches, on round or irregular leaf-spots, which are at first yellow and later a dirty brown, closely and often irregularly grouped, long, cylindrical, up to 5 mm. long, peridium cut to the base in broad segments, white; cells of the peridium firmly joined together, elongated-rhomboid or sub-fusoid, 40–70 × 17–28 μ, inner wall densely marked with deep longitudinal striae, 12–22 μ thick, outer minutely verruculose, 4–5 μ thick. Spores sub-globose, ovate or ellipsoid, closely verruculose, sub-hyaline, 22–35 × 18–25 μ; epispore evenly 3–6 μ thick, or often thickened up to 8 μ.

Host: Rafnia perfoliata E. Mey., Cape Province, MacOwan (Rabh. Fung. Eur. 3321) [3661].

Also recorded on R. amplexicaulis and R. angulata.

forma **tumefaciens** Wint.

in Flora LXVII, 1884, p. 264; Monogr. Ured. IV, p. 220.

Differs in habit, producing large tumors measuring up to 4·5 cm. diam., lobed, fleshy, produced by the aecidia in the younger branches.

Host: Rafnia angulata Thun., Cape Province, MacOwan (Rabh. Fung. Eur. 3838) [4178]; Capetown, 7.8.07, Saxton [389]; Stellenbosch, 20.7.11, Van der Bijl [1837]; Klapmuts, Cape Province, 20.6.13 and 17.4.14, Van der Bijl [6822 and 7729].

Vigna Savi.

55. **Aecidium Vignae** Cke.

in Grevillea VIII, 1879, p. 71; Syd. Monogr. Ured. IV, p. 222.

Aecidia hypophyllous, occasionally an odd one being epiphyllous, closely and evenly clothing the whole of the leaf surface or the greater part of it, about 250 μ diam.; margin of the peridium white, revolute, lacerate; cells of the peridium firmly joined together, rectangular, square to sub-rhomboid, 25–40 × 18–26 μ, outer wall deeply striate, 7–10 μ thick, inner wall closely and coarsely verrucose, 4–6 μ thick. Spores angular-globose or ellipsoid, sub-hyaline, 20–25 × 18–22 μ; epispore 1·5–2 μ thick, closely and minutely verruculose.

Host: Vigna marginata Benth., Inanda, Natal, March, 1881, Medley Wood 407 [367, 10319, 11202, 13086].

Species parasitic on **Ranunculaceae.**

56. **Aecidium Englerianum** P. Henn. et Lindau.

in Engl. Bot. Jahrb. XVII, 1893, p. 14; Syd. Monogr. Ured. IV, p. 256.

Aecidia amphigenous, mostly hypophyllous and often caulicolous; on the leaves, forming depressed spots on one side and on the other thick gall-like pustules, 1–10 mm. diam.; on the stems and petioles also producing gall-like tumors, but these are lobed, branched or

with horn-like protuberances, up to 5 cm. diam. Aecidia cupulate, deeply immersed, 400–600 μ diam., margin of peridium thick, involute ; cells of the peridium firmly joined together, irregular, 30–45 × 16–23 μ, outer wall striate 6–8 μ thick, inner closely and coarsely verrucose, 4–6 μ thick. Spores irregular, sub-globose, ovate, ellipsoid or oblong, sub-hyaline, 22–30 × 13–22 μ ; epispore hyaline 1·5–2 μ thick, closely verruculose ; contents yellow.

Host : Clematis brachiata Thun., Lemana, Northern Transvaal, 14.8.11, Doidge [1796] ; Harrismith, Orange Free State, January, 1919, Putterill [11870] ; East London, Cape Province, 10.7.24, Munro [19862].

Distribution : Widely distributed in Tropical Africa (Abyssinia, East and West Central Africa). It has not previously been recorded south of the Zambesi.

57. **Aecidia Clematidis-brachiatae** n. sp.

Spermogones very freely developed, amphigenous, but mostly epiphyllous, often intermixed with the aecidia, honey-yellow, becoming almost black with age, 130–150 μ diam.

Aecidia hypophyllous or an occasional one also epiphyllous, not forming galls, but the midrib and petiole when involved are somewhat thickened, closely crowded or round or elongated, brown leaf-spots up to 8 mm. long, cupulate 300–400 μ diam., margin of the peridum slightly recurved, incised ; cells of the peridium sub-rhomboid to oblong, firmly joined together, 30–45 × 20–27, outer wall striate, 4–5 μ thick, inner verruculose 3–4 μ thick. Spores ellipsoid, ovate or sub-globose, sub-hyaline, 27–40 × 17–27 μ ; epispore 2–2·5 μ thick, delicately verruculose.

Host : Clematis brachiata Thun., Fountains, Pretoria District, 28.3.12, Pole Evans [2337] ; same locality, 24.5.12, Coetsee [2319].

Distribution : Transvaal.

Differs from Aecidium Englerianum in the absence of tumour formation, the copious evolution of spermogones, the smaller aecidia and larger spores.

58. **Aecidium Ranunculacearum** D.C.

in Fl. Fr. Vol. 6, p. 97, 1805.

Spermogones amphigenous, crowded in small groups, mixed with the aecidia, immersed, honey-yellow.

Aecidia amphigenous (mostly hypophyllous) and petiolicolous, in crowded groups, on the leaves on round brown leaf-spots up to 5 mm. diam., on the petioles in elongated groups up to 10 mm. diam. ; orange-yellow, cupulate, partly immersed, 250–300 μ diam. ; margin of the peridium white, recurved, incised ; cells of the peridium firmly joined together, sub-rhomboid to oblong, 20–30 × 16–20 μ, outer wall striate, 5–6 μ thick, inner verrucose, 3–4 μ thick. Spores sub-hyaline, ellipsoid, sub-clavate or sub-globose, 20–30 × 13–18 μ ; epispore 1–1·5 μ thick, very delicately and closely verruculose.

Host : Ranunculus pinnatus Poir., Potchefstroom, 5.11.06, Pole Evans [196] ; Riet Vlei, Irene, Pretoria District, 2.11.08 [540].

This is a composite species world-wide in distribution, composed of several biological species, which are indistinguishable morphologically.

The form on Ranunculus auricomus, R. bulbosus and Ficaria repens = Uromyces Poae.

The form on R. acris, bulbosa, repens = U. Dactylidis.

The form on R. bulbosus, repens = P. Magnusiana.

The South African form on R. pinnatus has not been connected with any teleutostage.

Species parasitic on **Portulacaceae.**

59. **Aecidium talinophilum** Syd.

in Monogr. Ured. IV, p. 263, 1924.

Aecidia hypophyllous, or an occasional one epiphyllous, closely crowded in round groups, 4–10 mm. diam., briefly cylindrical, about 200–250 μ diam.; margin of the peridium lacerate, slightly or moderately reflexed; cells of the peridium firmly joined together, rhomboid, 25–32 × 18–22 μ, outer wall striate, 6–8 μ thick, inner verrucose, 3–4 μ thick. Spores angular-globose, ovate, ellipsoid or irregular, usually polygonal, sub-hyaline, 17–24 × 16–18 μ; epispore 1–1·5 μ thick, densely verruculose.

Host: Talinum caffrum, Anasberge, South-West Africa, Dinter 187*a*.

Species parasitic on **Loranthaceae.**

60. **Aecidium Cookeanum** De Toni.

in Sacc. Syll. Fung. VII, 1888, p. 822; Syd. Monogr. Ured. IV, p. 269.

Aecidia hypophyllous, evenly distributed over the whole leaf surface or the greater part of it, a few also sometimes occur on the upper leaf surface, yellow, cylindrical, up to 1 mm. long, about 250 μ diam., margin of the peridium white, lacerate, cells of the peridium firmly joined together, 22–26 × 15–18 μ; outer wall striate, 7–9 μ thick, inner wall verrucose, 2·5–3 μ diam. Spores angular-globose, ovate or ellipsoid, or frequently irregular, pale yellow-brown, 22–26 × 17–20 μ; epispore about 2 μ thick, closely and minutely verruculose; germ pores evident.

Hosts: Loranthus Regii E. and Z., Kentani, Cape Province, 12.12.11, Pegler [1999].

Loranthus Zeyheri Harv., Wolhuter's Kop, Rustenburg District, 3.11.17, Putterill [10722]; Zilikats Nek, 15.4.20, Schilz [19870]; on Rustenburg road, 13.11.20, Pole Evans [17292].

Species parasitic on **Iridaceae.**

61. **Aecidium Antholyzae** Bubak.

in Annal. Mycol. IX, 1911, p. 144; Syd. Monogr. Ured. IV, p. 276.

Spermogones amphigenous, scattered or in small groups, brown.

Aecidia amphigenous on minute round spots, which are grey with reddish margins, scattered or in small groups, yellow, cupulate, about 200 μ diam., margin of the peridium somewhat revolute and slightly lacerate. Cells of the peridium rhomboid, 25–35 × 20–26 μ, outer wall striate, 6–10 μ thick, inner verrucose, 3–5 μ thick. Spores angular-globose, ovate, or ellipsoid, sub-hyaline, 20–26 × 18–23 μ; epispore 1·5–2 μ thick, closely and delicately verruculose.

Host: Antholyza aethiopica L., Kentani, Cape Province, 26.5.15, Pegler 2322 [9105].

62. **Aecidium clarum** Syd.

in Ann. Myc. X, 1912, p. 79; Monogr. Ured. IV, p. 277.

Aecidia hypophyllous, usually closely and equally clothing the whole leaf surface or the greater part of it, or irregularly placed; briefly cylindrical, 100–250 μ diam., white, margin of the peridium somewhat revolute and slightly incised, cells of the peridium firmly joined together, rhomboid, 22–38 × 16–23 μ, outer wall striate, 5–7 μ thick, inner verrucose, 3–4 μ thick. Spores angular-globose or often ovate, ellipsoid or oblong, sub-hyaline, 15–24 × 12–19 μ, epispore 1·5–2 μ thick, closely and minutely verruculose.

Host: Moraea kitambensis, Schaprioda, South-West Africa, 5.3.11, Dinter, 1910.

I have not seen this species.

Species parasitic on **Amaryllidaceae.**

63. **Aecidium Brunswigiae** P. Henn.

in Hedwigia XXXVII, 1898, p. 294; Syd. Monogr. Ured. IV, p. 278.

Aecidia hypophyllous, in circles on rather inconspicuous, round leaf-spots, 3–6 mm. diam., long remaining closed, at length open, cupulate, about 300 μ diam. yellow; cells of the peridium rather loosely connected, rectangular or variously polyhedric, 26–34 × 20–28 μ; outer wall striate, 4–5 μ thick; inner delicately verruculose, about 3 μ thick. Spores globose, sub-globose, ovate or ellipsoid, frequently irregular, sub-hyaline, 20–27 × 17–25 μ; epispore 1·5–2 μ thick, closely verruculose.

Host: Brunswigia sp., Olifant R., R. Schlechter.

I have not seen this species.

64. **Aecidium Crini** Kalch.

in Grevillea XI, 1882, p. 26; Syd. Monogr. Ured. IV, p. 279.

Syn. *Aecidium Macaranga* P. Henn. in Bot. Ergebnisse der Kunene–Sambesi Exped. Berlin, 1903, p. 163.

Spermogones epiphyllous, produced in large numbers, closely crowded, at first honey-yellow, then darker, 110–150 μ diam.

Aecidia hypophyllous, sometimes also epiphyllous, closely crowded in round or elliptical groups which may be small or fairly large, up to 1 cm. or even 2 cm. long. Aecidia cupulate, about 300 μ diam.; margin of the peridium white, reflexed, laciniate; cells of the peridium sub-rhomboid to oblong, 22–35 × 17–24 μ, outer wall deeply striate, 5–9 μ thick, inner coarsely aculeate-verrucose, 3–4 μ thick. Spores angular-globose, ovate or ellipsoid, sub-hyaline, 17–22 × 15–20 μ; epispore 1–1·5 μ thick, closely and minutely verruculose.

Hosts: Cyrtanthus angustifolius Ait. (= Crinum angustifolium) on leaves, Northern Transvaal, December, 1913, Wickens [7389].

Crinum longifolium Thun., Inanda, Natal, October, 1880, Medley Wood 68 [10285 and 13083]; Tzaneen, Northern Transvaal, 28.11.06, Burtt Davy [220]; Maritzburg, Natal, 1.12.15, Sim [9201]; Kentani, Cape Province, 21.9.18, Pegler [11792]; Pretoria, January, 1920, Bottomley [12839].

Crinum Moorei Hk. fil., Natal, Medley Wood [10284].

Crinum spp., Salisbury, Rhodesia, December, 1919, Eyles [14011]; Irene, Transvaal, 20.11.21, Pole Evans [15044]; Potgietersrust, Transvaal, 1.12.21, Melle [15045].

Distribution: South and Central Africa.

Species parasitic on **Liliaceae.**

Anthericum L.

65. **Aecidium Antherici** P. Henn. et Evans.

in Engl. Bot. Jahrb. XLI, 1908, p. 271, Syd. Monogr. Ured. IV, p. 280.

Aecidia amphigenous, closely crowded in elongated groups, up to 1 cm. long, briefly cylindrical or cupulate, 200–250 μ diam., white, margin of the peridium erect, very slightly denticulate; cells of the peridium firmly joined together, irregular, 22–30 × 18–24 μ. Spores sub-globose or more often ellipsoid or oblong, sub-hyaline, 17–25 × 15–19 μ; epispore 1·5 μ thick, closely and minutely verruculose.

Host: Anthericum sp., on leaves, Bethal, Transvaal, 1.12.05, Pole Evans [114].

Asparagus L.

66. **Aecidium Schlechterianum** P. Henn.

in Hedwigia XXXVII, 1898, p. 294.

Spermogones hypophyllous, fairly numerous, grouped in the centre of the leaf-spot, honey-yellow, 100–120 μ diam.

Aecidia hypophyllous, on round yellow spots, 3–5 mm. diam.; usually surrounding the spermogones, cupulate, 3–5 mm. diam.; margin of the peridium white, denticulate; cells of the peridium sub-rhomboid, 25–40 × 20–25 μ, outer wall striate, 8–11 μ thick, inner verrucose, 4–5 μ thick. Spores irregularly globose, ovate or ellipsoid, sub-hyaline, 23–35 × 18–24 μ; epispore 1·5–2·5 μ thick, closely verruculose.

Host: Asparagus medeoloides Thun., near Olifant R., Schlechter.

Not represented in the National Herbarium.

Bulbine L.

67. **Aecidium Bulbinis** P. Henn. et Evans.

in Engl. Bot. Jahrb. XLI, 1908, p. 271; Syd. Monogr. Ured. IV, p. 282.

Spermogones amphigenous, very numerous, closely crowded, at first honey yellow or yellow-brown, becoming darker with age, 110–160 μ diam.

Aecidia amphigenous, closely crowded on somewhat discoloured, oval, leaf-spots, up to 1·2 cm. long, surrounding the spermogones, briefly cylindrical, about 250 μ diam.; margin of the peridium white, incised; cells of the peridium firmly joined together, irregular, 24–32 × 17–24 μ, outer wall faintly striate, 6–10 μ thick, inner wall closely verruculose, 3–4 μ thick. Spores angular-globose, ovate or ellipsoid, sub-hyaline, 17–22 × 14–17 μ; epispore 1–1·5 μ thick, closely and delicately verruculose.

Hosts: Bulbine narcissifolia Salm Dyck, Zeerust, Transvaal, 3.11.06, Pole Evans [203]; Groenkloof, Pretoria District, December, 1914, Turner [8829].

Bulbine asphodeloides R. and S., Bloemfontein, Orange Free State, December, 1916, Potts [11314].

Chlorophytum Ker. (= Hartwegia Nees).

68 **Aecidium Hartwegiae** Thuem.

in Flora LX, 1877, p. 411; Syd. Monogr. Ured. IV, p. 283.

Syn. *Aecidium Chlorophyti* Har. et Par. in Bull. du Museum d'hist. nat., 1909, p. 200.
Aec. Chlorophyti Kalchbr. in sched.

O. Spermogones amphigenous in fairly large goups in the centre of the leaf-spot, at first brown then black, 100–150 μ diam.

I. Aecidia hypophyllous in more or less concentric groups, on pale leaf-spots, 1–2 cm. diam., cupulate, 250–300 μ diam.; margin of the peridium white, revolute, incised; cells of the peridium sub-quadratic to sub-rhomboid, 25–35 × 17–21 μ, outer wall delicately striate, 5–7 μ thick, inner aculeate-verrucose, 3–4 μ thick. Spores angular-globose, ovate, or ellipsoid, sub-hyaline, 20–25 × 17–20 μ; epispore 1–1·5 μ thick, closely and minutely verruculose.

Hosts: Chlorophytum (Hartwegia) comosum Baker, Boschberg Mts., near Somerset East, January, 1875, MacOwan, 1022 [20768].

Distribution: South and Central Africa.

Ornithogalum L.

69. **Aecidium Ornithogaleum** Bubak.

in Ann. Myc. III, 1905, p. 223; Syd. Monogr. Ured. IV, p. 287.

Spermogones fairly numerous, grouped in the centre of the leaf-spots or interspersed with the aecidia, amphigenous, honey-yellow, becoming darker with age, 100–150 μ diam.

Aecidia amphigenous, closely crowded on brown elliptic leaf-spots, up to 2 cm. diam., usually surrounding the spermogones, occasionally also on the inflorescence, briefly cylindrical, partly immersed, 200–300 μ diam., long remaining closed; margin of the peridium white, slightly recurved, incised; cells of the peridium firmly joined together, polygonal or almost rectangular, 25–30 × 13–24 μ; outer wall smooth or faintly striate, 8–10 μ thick, inner verruculose, 3–4 μ thick. Spores angular-globose to ellipsoid, sub-hyaline, 18–27 × 16–20 μ; epispore about 1·5 μ thick, very closely and delicately verruculose, almost punctate.

Hosts: Ornithogalum Eckloni Schl., Armoeds Vlakte, Vryburg, 19.11.20, Mogg [14239].

Ornithogalum sp., Platriver, Pretoria District, 17.11.11, Pienaar [1941].

Distribution: South Africa, Europe.

The South African aecidium is indistinguishable morphologically from the European species.

Scilla L.

70. **Aecidium Doidgei** Syd.

in Ann. Myc. X, 1912, p. 36; Monogr. Ured. IV. p. 288.

Spermogones amphigenous, produced in considerable numbers, 100–125 μ diam., honey-yellow.

Aecidia amphigenous, on yellow leaf-spots, arranged in circles round the spermogones, in groups up to 1 cm. diam., briefly cylindrical, about 200 μ diam.; margin of the peridium white, incised, slightly revolute; cells of the peridium 20–35 × 15–20 μ, outer wall smooth or very delicately striate, 5–8 μ thick, inner wall verrucose, 3–5 μ thick. Spores angular-globose or ellipsoid, sub-hyaline, 16–20 × 14–18 μ; epispore 1·5–2 μ thick, closely and delicately verruculose.

Host: Scilla saturata Baker., on leaves, Belfast, Transvaal, November, 1909, Doidge [762].

Urginea Steinh.

71. **Aecidium Urgineae** P. Henn. et Evans.

in Engl. Bot. Jahrb. XLI, 1908, p. 272; Syd. Monogr. Ured. IV, p. 289.

Spermogones fairly numerous, more or less grouped, at first honey-yellow, later yellow-brown, 100–140 μ diam.

Aecidia in circles round the spermogones, forming small groups, which are round or oblong and 2–3 mm. long, about 250 μ diam.; peridium with a white incised margin; cells of the peridium irregular, 24–35 × 16–23 μ, outer wall striate, 5–7 μ thick, inner wall verrucose, 3–4 μ thick. Spores angular-globose, ovate or ellipsoid, sub-hyaline, 17–24 × 15–19 μ; epispore 1·5 μ thick, closely verruculose.

Host: Urginea sp., Emigratie, Swaziland, 30.11.05, Pole Evans [109].

Species parasitic on **Orchidaceae.**

72. **Aecidium Corycii** n. sp.

Aecidia amphigenous, scattered, minute, cupulate, 150–200 μ diam; margin of the peridum white, revolute, laciniate; cells of the peridium firmly joined together, rhomboid to polygonal, 25–35 × 16–20 μ, outer wall striate, 6–7 μ thick, inner verrucose, 3–4 μ thick. Spores sub-hyaline, angular-globose to ellipsoid, 20–22 × 15–17 μ; epispore about 1·5 μ thick, closely and delicately verruculose.

Host: Corycium nigrescens Sond., Kokstad, East Griqualand, 11.2.20, Mc Loughlin [12820].

CAEOMA Link.

in Magazin. der Gesellschaft Naturf. Freunde zu Berlin III, 1809, p. 5.
Similar to aecidium, but peridium absent.

Caeoma Heteromorphae n. sp.

Spermogones mixed with aecidia, fairly numerous, honey-yellow, 120–140 μ diam.

Aecidia hypophyllous, forming small tumours or gall-like swellings up to 3 mm. diam., which show as crater-like depressions on the upper surface, or petiolicolous surrounding the petiole, which becomes swollen for lengths up to 7 mm., yellow, convex, deep-seated, remaining covered indefinitely and frequently in two or more super-imposed rows, 300–400 μ diam., sub-spherical. Spores sub-globose, or angular to ellipsoid, 22–27 × 20–24 μ; epispore hyaline, about 3 μ thick, rather sparsely verruculose-echinulate, contents granular.

Host: Heteromorpha arborescens C. and S., Port Elizabeth, 22.9.16, Drége [9822].

UREDO Pers.

in Neues Magazin für die Botanik von J. J. Römer, I, 1794, p. 93.

Uredo-sori without peridia, frequently surrounded or mixed with paraphyses, erumpent, pulvinate, or pulverulent, sometimes long covered by the bullate epidermis, later usually surrounded by the ruptured epidermis. Uredospores borne singly on pedicels, never catenulate, globose, ellipsoid or ovate; epispore hyaline or coloured, echinulate or verrucose; germ-pores two or more, scattered or equatorial, conspicuous or indistinct, occasionally papillate.

South African from species recorded under the form genus Uredo–30.

Species parasitic on **Compositae.**

1. **Uredo Brachylaenae** n. sp.

Sori hypophyllous, producing small vague yellowish spots on the upper surface of the leaf, minute, punctiform, scattered, discrete, partly concealed in the tomentum on the under surface of the leaf, yellow-brown. Paraphyses very numerous, peripheral, cylindrical or sub-clavate, straight or slightly curved, septate, pale golden-brown at the tips, paler towards the base, up to 100 μ long, 10–17 μ thick near the apex, with a wall 2·5–3·5 μ thick near the apex, thinner below. Spores sub-globose, broadly ellipsoid or ovate, pale yellow-brown, 18–23·5 × 15–17 μ; epispore yellowish, about 1 μ thick, minutely and rather sparsely verruculose-echinulate; germ pores obscure.

Hosts: Brachylaena discolor DC., Umgeni Beach, Durban, Natal, 7.7.12, Doidge [2525]; Durban, 29.1.17, Van der Bijl [11026].

Brachylaena transvaalensis Hutch., Lemana, Northern Transvaal, 4.8.11, Doidge [1821].

Brachylaena neriifolia R. Br., Bains Kloof, near Wellington, Cape Province, 12.11.10, Doidge [982].

This fungus is of a very similar type to Uredo Grewiae Pat. et Har., and is possibly the uredo-stage of one of the Melampsoraceae.

Species parasitic on **Cucurbitaceae.**

2. **Uredo Zehneriae** Thuem.

in Flora LX, 1877, p. 410; Syd. Monogr. Ured. IV, p. 402.

Syn. *Uredo cantonensis* Yates in Philippine Jour. Sci. Sect. C. Bot. XII, p. 315 (1917).

Sori hypophyllous, on light brown leaf-spots, scattered or irregularly grouped, often in circles, round, 0·5–1 mm. diam., surrounded by the torn epidermis, cinnamon brown. Spores globose, sub-globose or broadly ellipsoid, light brown, 20–27 × 17–23 μ; epispore about 1·5 μ thick, delicately and rather sparsely echinulate, yellow, and with 2 equatorial germ pores.

Host: Zehneria scabra Sond., on the banks of the Groot Visch Rivier, near Cook-house Drift, July, 1876, MacOwan, 1271.

Distribution: South Africa, China.

A. *Uredo Zehneriae*, spores.
B. *Puccinia Cephalandrae*, uredospores from *Zehneria*.

I am indebted to the Director of the South African Museum for the loan of this specimen. Uredo Zehneriae is quite distinct from the uredo-stage of Puccinia Cephalandrae, which occurs on the same host.

Species parasitic on **Acanthaceae.**

3. **Uredo Hypoestis** (Cke.), De Toni.

in Sacc. Syll. Fung. VII, 1888, p. 850; Syd. Monogr. Ured. IV, p. 410.

Syn. *Trichobasis Hypoestis* Cke. in Grevillea X, p. 128 (1882).

Sori amphigenous, but mostly hypophyllous, scattered, round, very minute, remaining rather long covered by the epidermis, later pulverulent and surrounded by the torn epidermis, cinnamon-brown. Spores globose, sub-globose, ovate or ellipsoid, brown, 25–30 × 20–25 μ; epispore golden-brown, about 2 μ thick, rather coarsely and sparsely echinulate, and with 2 equatorial germ pores.

Hosts: Hypoestes antennifera S. Moore, Inanda, Natal, 10.6.81, Medley Wood 589 [824 and 10621]; Stella Bush, Durban, 11.7.11, Doidge [1625].

Hypoestes verticillaris R. Br., Port Alfred, Cape Province, 16.10.15, Tyson [9108].

Isoglossa Woodii C.B.Cl., Lemana, Northern Transvaal, 14.8.11, Doidge [1831].

The uredo on Isoglossa is apparently identical with U. Hypoestis, but it may possibly be the uredo-stage of Puccinia Isoglossae, although there is at present nothing to connect the two. The hosts are closely related.

Species parasitic on **Asclepiadaceae.**

4. **Uredo Asclepiadis-fruticosi** n. sp.

Sori hypophyllous and caulicolous, scattered, often very numerous on the leaves and covering practically the whole of the lower surface, then crowded and tending to become confluent, minute, cinnamon-brown, round to irregular, surrounded by the torn epidermis, pulverulent. Spores light brown, obovate or ellipsoid, rarely sub-globose, 20–28 × 13–19 μ; epispore pale yellow, about 3 μ thick, briefly and rather sparsely echinulate and with 2 equatorial germ pores.

Host: Asclepias fruticosus Linn., Armadillo Creek, Vryburg District, 17.11.11, Burtt Davy [1938].

Differs from uredo-generation of Uromyces Howei Peck., in the form and colour of the uredospores and in the thickness of the epispore.

5. **Uredo Cryptolepidis** Cke.

in Grevillea XIX, 1890, p. 6; Syd. Monogr. Ured. IV, p. 426.

Sori hypophyllous, in small groups on yellow leaf-spots, minute, waxy, pale, surrounded by paraphyses, which are hyphoid or clavate, hyaline, 30–45 μ long, 6–12 μ thick at the apex, very thin walled throughout (wall 1 μ thick). Spores globose, sub-globose or ovate, sub-hyaline, 20–25 × 18–21 μ; epispore 1–1·5 μ thick, aculeate, germ pores obscure.

Hosts: Cryptolepis capensis Schltr., Kentani, Cape Province, 20.9.15, Pegler 2356 [9164]; Bluff, Durban, 7.7.11, Pole Evans and Doidge [1603 and 1664].

Cryptolepis obtusa N.E. Br., Lourenço Marques, Portuguese East Africa, 28.6.09 [665].

6. **Uredo Ectadiopsis** Cke.

in Grevillea X, 1882, p. 128; Syd. Monogr. Ured. IV, p. 428.

Sori hypophyllous, pulverulent, very minute, but confluent, light yellow-brown or brown. Spores globose or sub-globose, yellow, 18–24 × 17–20 μ; epispore 1 μ thick, rather closely echinulate, germ pores obscure.

Host: Cryptolepis oblongifolia Schltr. (= Ectadiopsis oblongifolia), Inanda, Natal, June, 1881, Medley Wood 600 [10584 and 11220].

The above is part of Medley Wood's original collection, but it is unfortunately in poor condition, most of the spores having been destroyed by insects. The description is taken from Sydow (*loc. cit.*).

Species parasitic on **Araliaceae.**

7. **Uredo Cussoniae** Cke.

in Grevillea XVI, p. 70; Syd. Monogr. Ured. IV, p. 441.

Sori hypophyllous, on minute, round, yellow-brown leaf-spots, scattered, round, 0·3–0·5 mm. diam., rather long covered by the epidermis, later surrounded by the torn epidermis, pulverulent, light brown. Spores ellipsoid or oblong, yellow or pale yellow-brown, 22–30 × 13–17 μ; epispore hyaline, 1·5–2 μ thick, rather coarsely and sparsely echinulate, with 2, conspicuously papillate, equatorial germ pores.

Host: Cussonia sp., Inanda, Natal, 12.3.86, Medley Wood [362].

Species parasitic on **Combretaceae.**

8. **Uredo longaensis** P. Henn.

in Bot. Ergebnisse der Kunene-Sambesi. Expedition, Berlin, 1903, p. 159; Syd. Monogr. Ured IV, p. 444.

Sori hypophyllous, producing vague yellow-brown spots on the upper leaf surface, which are 1–4 cm. long; closely crowded in large groups which entirely fill the leaf-spots, long covered by the blistered epidermis, single sori irregular, angular, limited by the leaf veins, 1–4 mm. diam. Spores in chains, angular-globose to ellipsoid, sub-hyaline, 17–25 × 15–21 μ; epispore 1–1·5 μ thick, delicately verruculose.

Host: Combretum Baumii, banks of the Longa River, H. Baum.

Not represented in the Herbarium; the description is taken from Sydow (*loc. cit.*).

Species parasitic on **Tiliaceae.**

9. **Uredo Grewiae** Pat. et. Har.

in Journal. de Bot. XIV, 1900, p. 237; Syd. Monogr. Ured. IV, p. 453.

Sori hypophyllous, producing on the upper surface of the leaf somewhat inconspicuous reddish-yellow spots, round, distinct, scattered more or less thickly over the whole leaf surface, punctiform, opening by a round central pore, yellow-brown. Paraphyses very copious, peripheral, cylindrical or sub-clavate, straight or slightly curved, sub-hyaline to pale golden-brown, 25–45 μ long, 6–9 μ thick, the wall varies in thickness, one side often thicker than the other Spores sub-globose, ovate, ellipsoid or pyriform, pale yellow-brown, 20–28 × 15–21 μ; epispore hyaline, very delicate, about 1 μ thick, densely and minutely verruculose or briefly verruculose-echinulate. Germ pores obscure.

Host: Grewia cana Sond., Koodoo's Poort, Pretoria, 1.4.11, Pole Evans [1304]; same locality, 13.7.11, Pearson [1585].

Originally described on Grewia ferruginea from Senegal.

Species parasitic on **Euphorbiaceae.**

10. **Uredo Brideliae** (P. Henn. et Evans) Doidge comb. nov. = *Haas...* 91.

Syn. *Aecidium Brideliae* P. Henn. et Evans in Engl. Bot. Jahrb. XLI, 1908, p. 272; Syd. Monogr. Ured. IV, p. 186.

Uredo-sori hypophyllous on very small, yellow or yellow-brown leaf-spots, in small groups of 2–8, long covered by the epidermis, which finally ruptures, 200–350 μ diam., yellow-brown. Uredospores ovate-globose or ellipsoid, sub-hyaline, 17–22 × 14–17 μ; epispore 1·5–2 μ thick, minutely verruculose-echinulate; germ pores obscure. Each sorus surrounded by several rows of palisade-like, septate ? paraphyses, which often extend for some distance under the epidermis, these are thin-walled, sub-hyaline, up to 130 μ long and 5–10 μ thick, being somewhat similar in appearance to the teleuto-sorus of a Schroeteriaster.

Host: Fluggea microcarpa Blume, on leaves, near Nelspruit, 1.2.06, Burtt Davy [77].

It was pointed out by Sydow (*loc. cit.*) that there are no peridial cells in this species, so that it is probably a uredo-form. His material, however, was too poor for detailed study. The spores become crowded in the sorus before the epidermis is ruptured, but are not catenulate.

The host was incorrectly determined as Bridelia sp.

Species parasitic on **Polygalaceae.**

11. **Uredo Polygalae** Kalch.

in Grevillea XI, 1882, p. 25; Syd. Monogr. Ured. IV, p. 461.

Syn. *Uredo Polygalae* Diet. in Engl. Bot. Jahrb. XXXVII, p. 108 (1905).

Sori hypophyllous on indefinite yellow leaf-spots, scattered or in circles, sometimes confluent, round or irregular, about 0·3–0·5 mm. diam., at first covered by the blistered epidermis, then surrounded by the ruptured epidermis, ochraceous, pulverulent. Spores sub-globose, ovate or ellipsoid, yellow-brown or brown, 17–23 × 15–18 μ; epispore about 2 μ thick, delicately echinulate, with two equatorial germ pores.

Host: Polygala Ohlendorfiana E. and Z., near Somerset East, MacOwan.

Distribution: South Africa, Japan.

The above description is taken from Sydow; unfortunately this species is not represented in the National Herbarium nor in the South African Museum collection.

Species parasitic on **Burseraceae.**

12. **Uredo Balsamodendri** Cke.

in Grevillea XIX, 1890, p. 6; Syd. Monogr. Ured. IV, p. 464.

Sori hypophyllous, on brown leaf-spots, 1–2 cm. diam., scattered or irregularly grouped, round, about 0·5 mm. diam., soon becoming naked, light brown, compact. Paraphyses copious, cylindrical, yellow or light brown, usually thin-walled throughout, 50–80 × 8–12 μ. Spres ovate, ellipsoid or pyriform, often slightly asymmetrical, cristate-verruculose, 25–35 × 18–24 μ; outer wall sub-hyaline, swelling slightly in water, up to 2 μ; inner wall light brown, about 1 μ thick. Germ pores obscure.

Host: Balsamea sp., Durban, Natal, June, 1882, Medley Wood [689, 689, 796, and 10578].

Species parasitic on **Zygophyllaceae.**

13. **Uredo Augeae** Pole Evans.

in Annals Bolus Herb. I, 1915, p. 115; Syd. Monogr. Ured. IV, p. 465.

Syn. *Uredo Augeae* Syd. in Ann. Myc. XIV, p. 259 (1916).

Sori amphigenous, not on leaf-spots, scattered or arranged in circles, often sparsely and evenly covering the whole leaf surface, round, 0·5–1·5 mm. diam., long covered by the blistered epidermis, then surrounded by torn epidermis, chestnut brown. Spores sub-globose, ellipsoid or ovate, often more or less angular, yellow-brown to brown, 23–34 × 18–25 μ; epispore 2·5–3 μ thick, closely and minutely verruculose-echinulate, and with 6–8 scattered germ pores.

Host: Augea capensis Thun., Luderitzbucht, South-West Africa, November, 1912, Pearson [8406]; Laingsburg, Prince Albert, Cape Province, 7.11.10, Burtt-Davy [18086].

Species parasitic on **Leguminosae.**

14. **Uredo Alysicarpi** n. sp.

Sori hypophyllous, not on leaf-spots, scattered, very minute, cinnamon-brown, round or oblong, surrounded by the torn epidermis, pulverulent. Spores sub-globose or ovate, golden-brown, 18–22 × 16–20 μ; epispore golden-brown, 2–2·5 μ thick, delicately verruculose, and with 3–4 scattered germ pores.

Hosts: Alysicarpus rugosus D.C., Olifantsfontein, Transvaal, 21.2.20, Pienaar [12821].

Alysicarpus Wallichi W. and A., Skinner's Court, Pretoria, 26.11.09, Pole Evans [915].

15. **Uredo kampuluvensis** P. Henn.

in Bot. Ergebnisse der Kunene–Sambesi Exped. Berlin, 1903, p. 159; Syd. Monogr. Ured. IV, p. 469.

Sori hypophyllous, producing minute spots, which show on the upper surface, about 1 mm. diam., scattered or in groups and confluent; single sori minute, rusty-brown, pulverulent. Paraphyses cylindrical or cylindrical-capitate, copious, yellow or light yellow-brown, paler towards the base, usually curving inwards, 30–40 μ long, near apex 10–14 μ broad, septate, with a very thick wall, and hardly any lumen. Spores ovate, pyriform or reniform, yellow or light yellow-brown, 20–28 × 17–22 μ, epispore 1·5 μ thick, closely and briefly echinulate, with 6–8 scattered germ pores.

Host: Baphia cornifolia Harms. Kampuluve R., 7.4.1900, Baum [6880].

16. **Uredo crotalariicola** P. Henn.

in H. Baum, Botan. Ergebnisse der Kunene–Sambesi Exped. p. 158 (1903): Syd. Monogr. Ured. IV, p. 476.

Sori hypophyllous, not on leaf spots or on indistinct brownish spots, scattered or in circles, round, about 0·5 mm. diam., surrounded by the torn epidermis, pulverulent, rusty-brown. Spores globose, sub-globose, or broadly ellipsoid, yellow-brown or light golden-brown, 24–30 × 21–28 μ; epispore 5–7 μ thick, briefly echinulate, and with about 6 scattered germ pores.

Host: Crotalaria lachnoclada Harms., Longa R., 23.1.1900, Baum [6882].

17. **Uredo Indigoferae** n. sp.

Sori amphigenous, but more numerous on the under-side of the leaf, scattered, minute, round, cinnamon-brown, long covered by the blistered epidermis, which finally ruptures and remains surrounding or partially veiling the spores. Spores brown, sub-globose or broadly ellipsoid, 20–23 × 16–19 μ; epispore golden-brown, about 2 μ thick, briefly and rather sparsely echinulate and with 3–4 rather conspicuous, papillate germ pores.

Type

Hosts: Indigofera endecaphylla Jacq., Wagen Drift, Pretoria District, 28.1.18, Doidge [11330].

Indigofera pretoriana Harms., Garstfontein, Pretoria District, 13.4.11, Erasmus [1455].

Indigofera spp., Barberton, 29.8.11, Pole Evans [1853 and 1854].

18. **Uredo Lonchocarpi** n. sp.

Amphigenous and on the legumes, forming gall-like or pulvinate thickenings on the under surface of the leaves, often in the centre of brown leaf-spots, up to 1·5 cm. diam.; often very numerous on the pods and covering practically the whole surface. Sori sub-epidermal, very minute, closely crowded, and becoming confluent, forming large pulvinate or crustaceous areas, rusty-brown. Spores ovate, broadly ellipsoid or sub-globose, very pale brown, 25–35 × 16–25 μ; epispore yellowish, 3–4 μ thick at the base, and gradually increasing in thickness towards the apex, where it is 5–8·5 μ, coarsely and rather remotely echinulate and with four equatorial germ pores. Paraphyses extremely numerous, clavate, near apex curved or cochleate, bent, pale yellowish-brown, rather thick-walled, up to 100 μ long and about 10 μ thick at the apex.

Host: Lonchocarpus Capassa Rolfe, Umbelusi, Portuguese East Africa, 3.8.08, Howard [532 and 533]; Olifants River Rank, Transvaal, 14.1.18, Pole Evans [11021]; Komati Poort, 27.4.20, Pole Evans [13091].

This is probably the uredo-stage of a Ravenelia. It differs from the uredo-generation of R. Lonchocarpi and R. Bakeriana occurring on Lonchocarpus in Brasil.

19. **Uredo Lotononi** n. sp.

Sori hypophyllous and caulicolous, minute, scattered, oblong, long covered by the blistered epidermis, later naked, pulverulent, brown. Spores light brown, sub-globose or ovate, 20–25 μ diam.; epispore rather sparsely and delicately echinulate, 1·5 μ thick, light brown and with 3–4 small but rather conspicuous papillate equatorial germ pores.

Hosts: Lotononis cytisoides Benth., Mont-aux-Sources, Natal, 20.4.19, Mogg [12955].

Lotononis hirsuta, near Irene, Pretoria District, 14.3.17, Pole Evans [10986].

20. **Uredo Stylosanthis** P. Henn.

in Hedwigia XXXVIII, 1899, p. (68); Syd. Monogr. Ured. IV, p. 485.

Sori hypophyllous, an occasional one being epiphyllous, leaf-spots indefinite, pale or brown or wanting, scattered or in small groups, round, about 0·5–1·5 mm. diam., surrounded by the torm epidermis, rusty or cinnamon-brown, pulverulent. Spores sub-globose, ovate or ellipsoid, golden-brown, 23–33 × 18–25 μ; epispore golden-brown, 2·5–3·5 μ thick, rather briefly and sparsely echinulate, and with two conspicuous equatorial germ pores.

Host: Stylosanthes setosa Harv., Barberton, 7.2.11, Pole Evans [1162].

Originally described by Hennings on Stylosanthes viscosa in East Africa.

Species parasitic on **Zingiberaceae.**

21. **Uredo Kaempferiae** Syd.

in Ann. Myc. XII (1914), p. 263; Syd. Monogr. Ured. IV, p. 511.

Sori hypophyllous, with or without indefinite yellowish leaf-spots, scattered, very minute, 0·1–0·2 mm. diam., at first covered by the epidermis, which later becomes torn and surrounds the sorus, rusty-brown, pulverulent. Spores usually ovate or ellipsoid, yellow or yellow-brown, 20–27 × 16–20 μ; epispore 2 μ thick, yellowish, delicately and sparsely echinulate, with 2 equatorial germ pores.

Host: Kaempferia ethelae, Quelimane, Portuguese East Africa, 8.9.13, Pole Evans [7387].

Species parasitic on **Iridaceae.**

22. **Uredo Homeriae** Bubak.

in Ann. Myc. IX, 1911, p. 143; Syd. Monogr. Ured. IV, p. 512.

Sori amphigenous, irregularly grouped, covering the whole leaf survace, rather briefly striiform or oblong, 0·5–1 mm. long, long covered by the straw-coloured epidermis, which finally opens by a slit. Spores globose or ellipsoid, often angular, pale yellow, 17–26 × 16–21 μ, epispore 2–2·5 μ thick, delicately verruculose or verruculose-echinulate, with several (4–6 ?) rather indistinct scattered germ pores.

Host: Homeria sp., Cape Province, Bachmann.

It is highly probable that this is the uredo-stage of Puccinia Moraeae, the description being almost identical with that of the uredo-stage of that species. I have not seen seen the type specimen and am therefore unable to decide this point by comparison.

23. **Uredo Moraeae** Kalch.

in Grevillea XI, 1882, p. 24; Syd. Monogr. Ured. IV, p. 512.

Sori amphigenous, scattered, elliptic or oblong, 0·5–1 mm. long, long covered by the yellow epidermis which finally splits longitudinally. Spores sub-globose, ovate or ellipsoid, often angular or irregular, pale yellow, 22–27 × 16–22 μ, epispore 2–2·5 μ thick, densely verruculose and with 6–8 scattered germ pores

Host: Homeria collina var. ochroleuca Salisb. (= Moraea grandiflora), Somerset East, MacOwan.

As Sydow (*loc. cit.*) remarks, it seems certain that this fungus belongs to one of the numerous Uromyces spp. on the Iridaceae. He suggests that it is closest to Uromyces Zeyheri Bubak; but in my opinion the description approximates more nearly to that of the uredo-stage of Puccinia Moraeae.

Unfortunately the type specimen is missing from the collections to which I have access and there has been no opportunity of settling the matter by comparison.

Species parasitic on **Commelinaceae.**

24. **Uredo Commelinae** Kalch.

in Grevillea XI, 1882, p. 24 (ubi erronee *U. Commelyneae* dicata), Syd. Monogr. Ured. IV, p. 519.

Sori hypophyllous a few scattered sori being epiphyllous or indefinite inconspicuous yellow spots, thickly crowded in more or less elongated groups, 1–4 mm. long, but not confluent; single sorus very minute, hemispherical, yellow-brown, surrounded by paraphyses, long remaining closed but finally opening by a central pore. Paraphyses cohering at the base, sub-hyaline to brownish, free above. Spores globose, ovate or ellipsoid, hyaline to yellowish, 14–22 × 13–17 μ; epispore 1·5 μ thick, very delicately and closely verruculose, germ pores obscure.

Host: Commelina madagascarica C.B. Cl., Inanda, Natal, Medley Wood 231 [10583 and 11204].

Commelina sp., Table Mountain Location, Natal, 18.5.11, Fuller [1677];

Medley Wood's material in the National Herbarium is in very bad condition owing to the attacks of insects.

Species parasitic on **Cyperaceae.**

25. **Uredo cypericola** P. Henn.

apud A Engler, Die Pflanzenwelt Ost.-Afrikas und der Nachbargebiete, Teil C., 1895, p. 52; Syd. Monogr. Ured. IV, p. 523.

Sori amphigenous, scattered, elliptic or oblong, 0·5–1 mm. long, often confluent, at first covered by the epidermis, which later becomes ruptured and surrounds the sorus, light brown, pulverulent. Spores sub-globose, ovate or ellipsoid, light brown or yellow-brown, 19–25 × 16–20 μ; epispore 1·5 μ thick, very delicately echinulate, and with 2 equatorial germ pores.

Hosts: Cyperus esculentus Drege., Fort Beaufort, March, 1907, Pole Evans [302] Groenkloof, Pretoria, 9.2.15, Pole Evans [8930].

Cyperus longus L. var. tenuiflorus Bouk., Natal, Medley Wood 4 [10579].

Cyperus spp., Thornville Junction, Natal, 22.3.10, Doidge [857 and 859]; Matotla, Portuguese East Africa, 28.4.09 [677].

26. **Uredo Fuirenae** P. Henn.

in Hedwigia XXXVIII, 1899, p. (70) ; Syd. Monogr. Ured. IV, p. 525.

Syn. *Uredo Fuirenae* Rostr. in Bot. Tidsskrift XXIV, p. 205 (1902).
U. Rostrupii P. Henn. in Hedw. XLII, p. (320) (1903].

Sori hypophyllous, scattered, linear, 0·5–1·5 mm. long, at first covered by the epidermis, brown. Spores sub-globose, or often ovate or ellipsoid, brown, 22–30 × 17–22 μ ; epispore 2–2·5 μ thick, golden-brown, rather sparsely echinulate, and with 2 equatorial germ pores.

Host : Fuirena coerulescens Steud., Town Bush Valley, Maritzburg, 7.4.11, Pole Evans [1444].

Species parasitic on **Gramineae.**

27. **Uredo Pogonarthriae** Syd. = *Puccinia pogonarthriae* Dirkins

in Ann. Myc. X, 1912, p. 35 ; Monogr. Ured. IV, p. 545.

Sori amphigenous, but mostly hypophyllous, scattered, oblong, 0·5–2 mm. long, surrounded by the torn epidermis, pulverulent, rusty-brown. Spores globose or sub-globose, light brown, 22–26 × 18–22 μ ; epispore light golden-brown, 1·5–2·5 μ thick, delicately echinulate and with about 6 scattered germ pores.

Host : Pogonarthria falcata Rend. L., Skinner's Court, Pretoria, 10.1.07, Pole Evans [228] ; Marico, 15.3.19, O'Connor [12230].

28. **Uredo Rottboelliae** Diet.

in Engl. Bot. Jahrb. XXXII, p. 52 ; Syd. Monogr. Ured. IV, p. 546.

Sori amphigenous, scattered, elliptic or oblong, minute, about 0·3–1 mm. long, long covered by the epidermis, brown. Spores sub-globose or ellipsoid, chestnut-brown, 26–35 × 24–27 μ ; epispore 1·5–2·5 μ thick, delicately echinulate, golden-brown and with 4 germ pores.

Hosts : Rottboellia exaltata Linn., Arcadia, Pretoria, 30.5.10, Burtt Davy [920].

Hemarthria fasciculata, Kunth. (= Rottboellia compressa var. fasciculata), Cedara, Natal, 24.4.23, Staples [17083]

Originally described on R. compressa var. japonicae in Japan, the South African fungus agrees very well with the description. Both specimens are heavily parasitised by Darluca.

29. **Uredo Stenotaphri** Syd.

in Ann. Myc. VII, 1909, p. 544 ; Monogr. Ured. IV, p. 548.

Sori epiphyllous, not on leaf-spots, scattered or in rows, elliptic or oblong, up to 0·5 mm. long, soon becoming naked, surrounded by the torn epidermis, pulverulent, rusty brown. Paraphyses not numerous, cylindrical, hyaline or sub-hyaline, 40–50 × 10–12 μ, wall 2–3 μ thick. Spores sub-globose, ovate or pyriform, yellow-brown or golden-brown, 26–38 × 22–28 μ ; epispore 1·5–2 μ thick, aculeate, golden brown, with 4 equatorial germ pores.

Host : Stenotaphrum glabrum, Trin., Lourenço Marques, Portuguese East Africa, 27.4.09, Howard [678].

Species insufficiently known.

30. **Uredo Celastrineae** Cke. et Mass.

in Grevillea XVII, 1889, p. 70; Syd. Monogr. Ured. IV, p. 575.

The original description reads :—

Soris hypophyllis, magnis, bullatis, epidermide tectis, gilvis; uredospores elongato-ellipsoideis (40–50 × 14–16 μ). Episporio crassiusculo, granuloso-verrucoso, hyalino, plasmate aurantiaco.

On living leaves of Salacia Kraussii, near Durban, October, 1888, Medley Wood 4028 [359 and 991].

Sydow. (*loc. cit.*) states that this is no Uredo, but an Aecidium. The aecidia are borne on slightly thickened parts of the leaf, deeply immersed, in round groups about 3–8 mm. diam. The bodies described as large uredospores are the verrucose peridial cells. The aecidiospores are globose or sub-globose, 18–24 μ diam., with a comparatively much thicker wall (3–5 μ).

Our material of Wood's collection has been practically destroyed by insects and is quite unfit for study; there is no other collection of an aecidium on this host in the herbarium.

LATIN DIAGNOSES of NEW SPECIES.

Melampsora Junodii sp. nov.

Uredo-sori hypophylli, maculis minutis flavidis insidentes, sparsi v. aggregati, rotundati, minuti, aurantiaco-flavi. Uredosporae ellipsoideae v. ovatae, rarius sub-globosae, 20–33 × 16–20 μ; epispore hyalino, circ. 1 μ crasso, minute denseque verruculoso-echinulato. Paraphyses capitatae, apice 15–16 μ crassae. Teleutosori hypophylli, sub-epidermici, maculis brunneis insidentes, sparsi, rotundati, minuti v. confluendo majores, obscure brunnei. Teleutosporae prismaticae brunneolae, 20–40 × 10–16 μ; episporio ad apicem leniter incrassato (circ. 3 μ).

Hab. in foliis Vernoniae senegalensis, Rikatli, Portuguese East Africa, leg. Junod [11723].

Puccinia Acalyphae sp. nov.

Uredospores haud numerosae, teleutosporis immixtae late ellipsoideae, flavidulae, 26–30 × 20–24 μ; episporio tenue, minute remoteque echinulato. Teleuto-sori amphigeni, minuti, sparsi vel aggregati, diutius epidermide tecti, subinde nudi, pulverulenti, brunnei. Teleutosporae luteo-brunneae, ellipsoideae v. clavatae, quoad formam et magnitudinem valde variabiles, medio haud vel vix constrictae, basi attenuatae, ad apicem rotundatae v. sub-acutae v. in papilla hyalina v. sub-hyalina usque 10 μ longa productae, 26–56 × 13–23 μ; episporio tenue, 1–1·5 μ cr., leve, apice haud vel leniter (usque 3·5 μ) incrassato; pedicello hyalino, deciduo, 6–8·5 μ crasso et usque 50 μ longo.

Hab. in foliis Acalyphae angustatae, The Willows, Pretoria District, 18.5.12, leg. Pole Evans [2309].

Puccinia Alepideae sp. nov.

Teleuto-sori amphigeni, maculis indeterminatis brunneis insidentes, sparsi v. aggregati, minuti, atro-brunnei, pulverulenti, epidermide disrupta cincti. Teleutosporae brunneae, sub-globosae v. late ellipsoideae, utrinque rotundatae, medio haud vel vix constrictae, 28–37 × 21–30 μ; episporio 2·5–3 μ crasso, ad apicem leniter (usque 5 μ) incrassato, sparse verruculoso; pedicello hyalino, tenue, usque 40 μ longo, nonnunquam oblique inserto.

Hab. in foliis Alepideae sp., Tugela Valley, Mont aux Sources, Natal, 16.5.20, leg. Doidge [14158].

Puccinia Becii sp. nov.

Aecidia hypophylla, maculis flavidis v. brunneolis insidentia, in greges 1–4 mm. diam., densiuscule disposita, cupulata, 250–300 μ diam., margine leniter recurvo et inciso; cellulis peridii oblongis, 17–22 μ longis, pariete exteriore striato, 5–6 μ crasso, interiore verruculoso, 3–4 μ crasso. Sporae sub-globosae vel late ellipsoideae, dense minuteque verruculosae, 16–20 × 13–17 μ, membrana hyalina vix 1 μ crassa. Teleuto-sori hypophylli, atro-brunnei, minuti. Teleutosporae dilute castaneo-brunneae, clavatae v. cuneatae, basi attenuatae, medio haud vel vix constrictae, ad apicem rotundatae, acutae v. acuminatae, rarius truncatae, 40–70 × 17–27 μ; episporio leve, ca. 1 μ crasso, apice valde incrassato (10–20 μ); pedicello breve, usque 15 μ, bruneolo.

Hab. in foliis Becii obovati, Graskop, Transvaal, 16.1.21, leg. Pole Evans [6609].

Puccinia berkheyicola sp. nov.

Uredo-sori amphigeni, sparsi, rotundati vel elliptici, usque 0·5 mm. diam., ochracei, pulverulenti; uredosporae castaneo-brunneae, globosae, sub-globosae vel late ellipsoideae, 25–34 μ diam., membrana hyalina ca 3 μ crassa, echinulata, poris germinationis 3 instructa. Teleuto-sori amphigeni, plerumque hypophylli, atri, sparsi vel pauci aggregati, rotundati v. irregulares, usque 1 mm. diam., pulverulenti, epidermide disrupta cincti. Teleutosporae sub-globosae v. late ellipsoideae, apice late rotundatae, medio leniter constrictae, basi plerumque late rotundatae vel leniter tantum attenuatae, brunneae, 36–44 × 26–33 μ, raro usque 54 μ longae; episporio 5–6·5 μ crasso, verrucoso, ad apicem non vel vix crassiore, poro germinationis cellulae superioris apicale; pedicello sub-hyalino, verticale, obliquo vel laterale, 8–10 μ crasso, usque 110 μ longo.

Hab. in foliis Berkheyae setiferae DC., Kaalfontein, Transvaal, 27.3.17, leg. I.B. Pole Evans [10079].

Puccinia Bulbostylidis sp. nov.

Uredo-sori hypophylli, maculis fuscis insidentes, sparsi v. seriatim dispositi, elliptici v. lineares, diutius epidermide bullata tecti, ferruginei, pulverulenti. Uredosporae ellipsoideae v. sub-globosae, brunneae, 16–20 × 21–28 μ; episporio flavido-brunneo, 3–3·5 μ crasso, plerumque ad apicem leniter incrassato, minute verruculoso. Teleuto-sori conformes, atri, et semper epidermide tecti. Teleutosporae clavatae v. ellipsoideae, fuscae, ad apicem obscuriores, rotundatae, ad apicem recte v. oblique acuminatae v. truncatae, medio leniter constrictae, ad basim attenuatae v. rarius sub-rotundatae, 33–60 × 13–19 μ; episporio leve, circ. 1·5–2 μ crasso, ad apicem leniter (usque 6·5 μ) incrassato; pedicello brunneolo, circ. 5 μ crasso, et usque 45 μ longo.

Hab. in foliis Bulbostylidis Burchellii, Commando Nek, Transvaal, 19.2.19, leg. Pole Evans [12236].

Puccinia Chaetacanthi sp. nov.

Uredosporae teleutosporis immixtae, late ellipsoideae, pyriformes v. irregulares, 30–37 × 23–27 μ; episporio flavido-brunneo, ca. 3 μ crasso, echinulato, poris germinationis 2 equatorialibus instructo. Teleuto-sori amphigeni, plerumque hypophylli, atri, convexi, diutius epidermide tecti. Teleutosporae sub-globosae vel late ellipsoideae, utrinque late rotundatae, medio haud vel vix constrictae, castaneo-brunneae, 40–47 × 26–37 μ; episporio 3–6 μ crasso, reticulate insculpto; pedicello hyalino recto v. sinuoso, usque 80 μ longo, verticale vel obliquo rarius laterale inserto.

Hab. in foliis Chaetacanthi glandulosi, Roodekop, Elands River, Transvaal, leg. M. R. H. Thomson [14697].

Puccinia Koedoeënsis sp. nov.

Uredo-sori amphigeni, sparsi, maculis minutis insidentes, rotundati vel elongati, usque 1 mm. diam., brunnei, pulverulenti. Uredo-sporae ellipsoideae vel late ellipsoideae, flavo-brunneae, 30–40 × 16–27 μ; episporio minute echinulato. Teleuto-sori amphigeni,

minuti, sparsi, maculis nullis, atri, rotundati v. angulati, pulverulenti, epidermide disrupta cincti. Teleutosporae late ellipsoideae v. sub-globosae, castaneo-brunneae, utrinque late rotundatae, cellulis aequalibus, 30–44 × 15–33 μ; episporio 5–6·5 μ crasso, ad apicem haud incrassato, minute verrucoso; pedicello hyalino usque 120 μ longo, poro germinationis cellulae superioris apicale, inferioris prope basim posito.

Hab. in foliis Vernoniae monocephalae, Koedoespoort, Pretoria District, 31.3.16, leg. I. B. Pole Evans [9686].

Puccinia Eylesii sp. nov.

Uredosporae in teleutosoris immixtae, sub-globosae v. ellipsoideae, brunneae, 20–24 × 16–20 μ; episporio brunneolo, 1·5–2 μ crasso, minute echinulato, poris germinationis numerosis, sparsis praedito. Teleuto-sori sparsi, amphigeni et inflorescenticoli, rotundati v. elliptici, mox nudi, pulvinati, minuti v. usque 1 mm. longi. Teleutosporae globosae v. sub-globosae, utrinque late rotundatae, medio haud constrictae, castaneo-brunneae, plerumque ad apicem obscuriorae, 23–34 × 21–34 μ; episporio crasso, ad basim 5–6·5 μ crasso, ad apicem 10–12 μ crasso; pedicello longo et crasso, hyalino v. brunneolo, circ. 5 μ crasso et usque 150 μ longo; nonnumquam oblique v. transverse inserto.

Hab. in foliis Aristidae sp., Salisbury, Rhodesia, May, 1920, leg. Eyles [15516].

Puccinia Fagarae sp. nov.

Teleuto-sori maculis brunneis elongatis insidentes, hypophylli, aggregati, minuti, epidermide circumdati, atri, pulverulenti. Teleutosporae ellipsoideae, sub-globosae, v. varie angulatae, ad apicem truncatae, sub-rotundatae, v. angulatae, basi rotundatae v. interdum attenuatae, medio haud vel leniter constrictae, castaneo-brunneae, 27–50 × 16·5–27 μ; episporio leve, 3–3·5 μ crasso, ad apicem haud incrassato; pedicello tenue, hyalino, sed apice brunneolo, usque 100 μ longo.

Hab. in foliis Fagarae Davyi, Pirie Forest, Kingwilliamstown, 8.7.19, leg. Doidge [12274].

Puccinia galerita sp. nov.

Teleuto-sori amphigeni, maculis minutis flavidulis insidentes, aggregati, minutissimi, atri, convexi, pulvinati, epidermide disrupta cincti. Teleutosporae clavatae v. clavato-ellipsoideae, flavidae, ad apicem obcuriorae (castaneo-brunneae), rotundatae, sub-acutae v. truncatae, basi attenuatae, medio haud vel vix constrictae, 30–44 × 20–24 μ; episporio hyalino, leve, ca. 1·5 μ crasso, ad apicem valde incrassato (usque 15 μ); pedicello hyalino, usque 30 μ longo.

Hab. in foliis Orthosiphonis Pretoriae, 18.4.17, Pretoria District, Leg. Pole Evans [10988].

Puccinia gerbericola sp. nov.

Teleuto-sori amphigeni, plerumque hypophylli, maculis pallidis vel brunneis indeterminatis insidentes, atro-brunnei, pulverulenti, epidermide disrupta cincti, pauci aggregati subinde confluentes, usque 2 mm. diam. Teleutosporae flavo-brunneolae, ellipsoideae v. sub-globosae leves ad basim rotundatae, ad apicem plerumque obtuse acuminatae, rarius rotundatae, sub-hyalinae, medio leniter constrictae, 33–44 × 20–25 μ; episporio 3–3·5 μ crasso ad apicem usque 10 μ incrassato, poro germinationis cellulae superioris apicale, inferioris ad septum posito; pedicello 6·5–7 μ crasso, brunneolo, usque 120 μ longo.

Hab. in foliis Gerberae sp., Garstfontein, Pretoria District, 14.5.13, leg. P. J. Pienaar [6661].

Puccinia Gladioli-crassifolii sp. nov.

Uredo-sori ochracei, minuti, oblongi, sparsi v. seriatim dispositi, diutius epidermide tecti. Uredosporae globosae v. sub-globosae, flavidae, 20–24 μ diam., episporio hyalino, circ. 2 μ crasso, minute verruculoso-echinulato. Teleuto-sori conformes, atro-brunnei. Teleutosporae oblongae, ellipsoideae v. sub-clavatae, ad apicem plerumque sub-acutae, rarius rotundatae, medio constrictae, ad basim attenuatae flavido-brunneae, 33–60 × 16–23 μ; episporio leve, circ. 2 μ crasso, ad apicem incrassato (usque 10 μ); pedicello brunneo, crasso usque 50 μ longo. Paraphyses nullae.

Hab. in foliis Gladioli crassifolii, Littleton Junction, 3.4.19, leg. Collyer [12227].

Puccinia Hennopsiana sp. nov.

Uredo-sori hypophylli et culmicoli, sparsi v. seriatim dispositi, usque 2 mm. longi, ochracei, diutius epidermide bullata tecti, tandem longitudinaliter aperti. Uredosporae ellipsoideae, ovatae v. sub-globosae, flavido-brunneae, 23–30 × 16–23 μ; episporio tenue, hyalino, vix 1 μ crasso, minute verruculoso-echinulato, poris germinationis 3–4 praedito. Teleuto-sori plerumque hypophylli, sparsi, minuti, semper epidermide tecti. Teleutosporae dilute brunneae, clavatae v. oblongae, ad apicem recte v. oblique acuminatae, rotundatae, truncatae v. denticulae, ad basim attenuatae, medio leniter constrictae, 40–80 × 15–20 μ; episporio leve, ca. 1 μ crasso, ad apicem valde (usue 10 μ) incrassato; pedicello brunneolo, usque 40 μ longo; paraphyses brunneae.

Hab. in foliis culmisque Marisci congesti, Hennops River, Pretoria District, 28.1.12, leg. Doidge [2038].

Puccinia Hyperici sp. nov.

Aecidia amphigena, plerumque hypophylla, in greges parvos disposita, minuta, cupulata, 240–280 μ diam., flavidula, margine albido, recurvo, laciniato; cellulae peridii rhomboidae imbricatae, 30–35 × 16–18 μ, pariete exteriore striato, 6–7 μ crasso, interiore verruculoso 3–4 μ crasso. Sporae globosae v. ellipsoidae, sub-hyalinae, 13–18·5 μ diam., membrana hyalina, tenue, minute verruculosa. Teleuto-sori amphigeni, plerumque hypophylli, inter aecidia sparsi v. aggregati, minuti, atro-brunnei, pulverulenti, epidermide disrupta cincti. Teleutosporae clavatae, dilute castaneo-brunneae ad apicem obscuriores, rotundatae, rarius sub-acutae v. truncatae, medio haud v. vix constrictae, basi attenuatae, 33–50 × 13–22 μ; episporio leve, ca 1·5 μ crasso, apice valde incrassato (usque 15 μ); pedicello sub-hyalino usque 18 μ longo.

Hab. in folius Hyperici sp., Garstfontein, Pretoria District, 12.10.13, leg. Pienaar [7087].

Puccinia Isoglossae sp. nov.

Teleuto-sori hypophylli, tuberculis verruciformis 1–3 mm. diam., plerumque in maculis, fuscis insidentes, compacti, pulvinati, atro-brunnei, 1–2 mm. diam., Teleutosporae fuscidulae, cylindraceae v. clavatae, basi attenuatae, ad apicem rotundatae, medio constrictae, 40–50 × 13–15 μ; episporio ca. 1 μ crasso, leve, apice incrassato (usque 5 μ); pedicello hyalino, usque 45 μ longo.

Hab. in foliis Isoglossae ovatae, Winkle Spruit, Natal, 5.6.12, leg. Pole Evans [2399].

Puccinia lemanensis sp. nov.

Teleuto-sori hypophylli, in greges (5–30) in maculis flavidulis dispositi, immersi, semper tecti, pallide fusci. Teleutosporae pallide flavae v. ellipsoideae, apice rotundatae, medio leniter v. modice constrictae, basi attenuatae v. subrotundatae, 46–64 × 20–26 μ; episporio tenue, leve, 1·5–2 μ crasso, ad apicem haud incrassato; pedicello hyalino, tenue, evanescente, usque 40 μ longo, 13 μ lato.

Hab. in foliis Toddaliae aculeatae, Lemana, Northern Transvaal, 14.9.11, leg. Doidge [1795].

Puccinia Monsoniae (Syd.) Doidge.

Syn. *Uredo Monsoniae* Syd. in Ann. Myc. X (1912), p. 34; Monogr. Ured. IV, p. 467.

Uredo-sori amphigeni, sparsi, minuti, brunei; uredosporae sub-globosae, ellipsoideae v. oblongae, tenuiter breveque echinulatae, 17–25 × 10–20 μ; episporio brunneolo, 1·5 2 μ crasso, poris germinationis 3 equatorialibus praedito. Teleutosori amphigeni, sparsi, minuti, atro-brunnei, pulverulenti, epidermide disrupta cincti. Teleutosporae brunneae, apice obscuriores, clavatae v. ellipsoideae, ad apicem rotundatae, sub-acutae v. depressae, basi attenuatae v. rarius rotundatae, medio constrictae, 43–60 × 16·5–26 μ; episporio leve, ca. 2 μ crasso, ad apicem usque 8·5 μ incrassato; pedicello pallide brunneolo, breve, usque 17 × 16·5 μ.

Hab. in foliis Monsoniae biflorae, The Thorns, Pretoria District, 24.5.11, leg. Doidge [1521].

Puccinia Ocimi sp. nov.

Aecidia hypophylla, maculis brunneolis insidentia, in greges 2–4 mm. diam. v. elongatos densiuscule disposita, cupulata v. breve cylindracea, 200–300 μ diam., margine recurvo, laciniato; cellulae peridii oblongae, 22–30 × 15–20 μ, pariete exteriore 6–8 μ crasso, striato, interiore verruculoso, 3–4 μ crasso. Sporae sub-globosae, ellipsoideae v. angulatae, 17–20 × 17–27 μ, dense minuteque verruculosae, membrana hyalina, 1–2 μ crassa. Teleutosori caulicoli et hypophylli, minuti, pulvinati, epidermide disrupta cincti. Teleutosporae brunneae, clavatae v. ellipsoideae, medio leniter constrictae, basi attenuatae, ad apicem rotundatae v. sub-acutae, 40–60 × 16–24 μ; episporio leve, 3–3·5 μ crasso, ad apicem usque 8·5 μ incrassato; pedicello hyalino v. flavidulo, usque 80 μ longo.

Hab. in foliis caulisque Ocimi americani, Zilikats Nek, Pretoria District, 14.2.19· Doidge [12244, 12245].

Puccinia Othonnae sp. nov.

Teleuto-sori amphigeni, sparsi, minuti, atri, pulverulenti, usque 1 mm. diam. Teleutosporae castaneae, late ellipsoideae, medio haud constrictae, utrinque late rotundatae, 43–60 × 33–40 μ; episporio 6·5–8 μ crasso, verrucoso, ad apicem haud incrassato; pedicello verticale vel obliquo, hyalino, circ. 10 μ crasso, usque 150 μ longo.

Hab. in foliis Othonnae natalensis, Olifantsfontein, Transvaal, 14.4.20, leg. P. J. Pienaar [13052].

Puccinia Pelargonii-zonalis sp. nov.

Uredo-sori hypophylli, maculis obsoletis pallidis insidentes, sparsi v. circinatim aggregati, 0·5–1·5 mm. diam., epidermide disrupte cincti, cinnamomei. Uredo-sporae late ovatae v. sub-globosae, flavo-brunneolae, 21–28·5 × 19–21·5 μ; episporio tenue, minute echinulato, 1·5–2 μ crasso. Teleuto-sporae haud numerosae, uredosporis immixtae, ellipsoideae v. clavatae, dilute brunneae, ad apicem rotundatae v. rarius sub-acutae, basi sub-rotundatae, rarius attenuatae, medio leniter constrictae, 36–60 × 16–23·5 μ; episporio leve, basi 1–2 μ crasso, ad apicem leniter incrassato (usque 5 μ); pedicello hyalino breve, usque 40 × 6·5 μ.

Hab. in foliis vivis Pelargonii zonalis, Scottsburg, Natal, 5.7.13, leg. I. B. Pole Evans [6843].

Puccinia Pole-Evansii sp. nov.

Uredo-sori amphigeni, sparsi v. aggregati, minuti, oblongi, diutius epidermide tecti· Uredo-sporae sub-globosae, ovatae, v. late ellipsoideae, 20–30 × 16·5–22 μ; episporio hyalino, 2–2·5 μ crasso, minute verruculoso-echinulato. Teleuto-sori amphigeni, maculis purpureo-brunneis insidentes, aggregati, minuti, atri, epidermide bullata diutius tecti. Teleutosporae pallide fuscae, ad apicem obscuriores, quoad formam et magnitudinem sat

irregulares, oblongae, clavatae v. ellipsoideae, ad apicem recte v. oblique acuminatae, rotundatae v. sub-truncatae, medio constrictae, ad basim attenuatae, 46–77 × 15–23 μ, plerumque 50–60 × 18–20 μ; episporio leve 2–3 μ crasso, ad apicem incrassato (usque 13·5 μ); pedicello pallide fusco, circ. 5 μ crasso et usque 50 μ longo.

Hab. in foliis Hypoxidis rigidulae, Kaalfontein, Transvaal, 18.4.17, leg. Pole Evans [10984].

Puccinia Pottsii sp. nov.

Uredosporae haud numerosae, teleutosporis immixtae, fuscae, late ellipsoideae v. sub-globosae, 23–27 × 20–25 μ; episporio brunneolo, circ. 2 μ crasso, modice echinulato, poris germinationis duobus minutis ad apicem sporae sitis praedito. Teleuto-sori hypophylli, sparsi v. aggregati, plerumque numerosi et dense gregarii, diutius epidermide bullata tecti, tandem longitudina iter aperti, pulverulenti. Teleutosporae clavatae pallide brunneae, ad apicem obscure castaneo-brunneae, plerumque late rotundatae, rarius sub-acuminatae, medio leniter constrictae, ad basim attenuatae, 40–54 × 16–30 μ; episporio leve, 2–2·5 μ crasso, ad apicem valde (usque 12 μ) incrassato; pedicello brunneolo, circ. 5 μ crasso, et usque 40 μ longo, paraphyses nullae.

Hab. in foliis Cyperi usitati, Bloemfontein, leg. Potts [11310].

Puccinia pretoriensis sp. nov.

Teleuto-sori amphigeni, maculis minutis purpurinis insidentes, minuti, atro-brunnei, sparsi vel aggregati, subinde confluentes, epidermide fissa cincti. Teleutosporae flavo-brunneolae, ellipsoideae, sub-globosae vel obovatae, ad apicem rotundatae vel obtuse v. conico-attenuatae, basi attenuata v. rotundatae, 33–53 × 20–30 μ; episporio 3–3·5 μ crasso, minute verruculoso, ad apicem incrassato (usque 7 μ); pedicello breve, hyalino, decidio.

Hab. in foliis Pentanisiae variabilis Harv., Garstfontein, Pretoria District, 14.5.13, leg. Pienaar [6663].

Puccinia ranulipes sp. nov.

Uredo-sori minuti, elliptici-oblongi, cinnamomeo-brunnei, diutius epidermide tecti, pulverulenti. Uredosporae ellipsoideae, sub-fusoidae v. ovatae, utrinque leniter attenuatae, ad apicem rotundati, basi truncatae, 40–60 × 20–25 μ; episporio 2–2·5 μ crasso, flavido, supero laxe verruculoso-echinulato, infero fere leve. Teleutosori numerosi, minuti atri, elliptici, pulvinati, compacti. Teleutosporae ellipsoideae v. sub-globosae, ad apicem rotundatae v. sub-acutae, ad basim rotundatae, medio haud vel vix constrictae, 40–50 × 23–30 μ; episporio leve, circ. 3 μ crasso, ad apicem leniter incrassato (usque 5 μ); pedicello ranuliforme usque 150 μ longo, hyalino, parte superiore vesiculoso-inflato sub-globose 30–43 μ diam., parte inferiore 6·5–10 μ crasso, ad basim attenuato.

Hab. in cladodis Asparagi laricini, Pretoria, 22.8.13, leg. Doidge [6925].

Puccinia Salviae-runcinatae sp. nov.

Aecidia amphigena at caulicola, in greges usque 5 mm. diam., densiuscule disposita, flavidula, cupulate, 300–400 μ diam., margine inciso; cellulae peridii rhomboideae v. oblongae, 25–40 × 20–25 μ, pariete exteriore 6–7 μ crasso, striato; interiore verrucoso, 3–4 μ crasso. Sporae sub-globosae oblongae v. ellipsoideae, 20–30 × 16–20 μ, minute verruculosae, membrana hyalina ca. 1·5 μ crasso. Uredo-sori hypophylli, minuti, sparsi, pulverulenti, brunnei, epidermide fissa cincti. Uredosporae globosae v. ellipsoideae, 20–24 × 16–20 μ; membrana brunnea ca. 1·5 μ crassa, echinulata, poris germinationis 3, equatorialibus instructa. Teleuto-sori caulicoli, elliptici, minuti, atri, bullati, epidermide diutius tecti, tandem aperti. Teleutosporae castaneo-brunneae, late ellipsoideae, utrinque

late rotundatae, medio haud v. vix constrictae, 40–45 × 23–35 μ; episporio leve, 3–3·5 μ crasso, apice leniter incrassato (usque 7 μ) pedicello hyalino tenue usque 100 μ longo, verticali v. obliquo, rarius tantum perfecte laterali.

Hab. in foliis Salviae runcinatae L., Skinner's Court, Pretoria District (I) Oct., 1910 and (III), 31.12.11, leg. I.B. Pole Evans [1008, 1062].

Puccinia transvaalensis sp. nov.

Uredo-sori hypophylli, sparsi v. seriatim dispositi, minuti, elliptici, longitudinaliter aperti, fusci. Uredosporae late ellipsoideae v. ovatae, brunneae, 23–27 × 16–23 μ; episporio brunneolo, minute verruculoso-echinulato, 3–3·5 μ crasso, ad apicem leniter incrassato, poris germinationis duobus papillatis praedito. Teleuto-sori conformes sed obscure brunnei, mox nudi. Teleutosporae oblongae, fuscae, ad apicem, rotundatae, medio leniter constrictae, ad basim attenuatae, rarius sub-rotundatae, 50–70 × 16–20 μ; episporio leve, 1–1·5 μ crasso, ad apicem valde (usque 11·5 μ) crasso; pedicello usque 40 μ longo, 10 μ crasso.

Hab. in foliis Cyperi sp., Belfast, Transvaal, February, 1909, leg. Doidge [570].

Puccinia Tristachyae sp. nov.

Syn. *Aecidium decipiens* Syd., Monogr. Ured. IV, p. 223,.

Uredo-sori hypophylli, minuti, oblongi, diutius epidermide tecti, brunnei. Uredosporae ovatae v. sub-globosae, brunneae, 28–34 × 21–30 μ; episporio brunneolo, circ. 2 μ crasso, tenue et laxe echinulato, poris germinationis 5–7 praedito. Paraphyses numerosae, capitatae, hyalinae v. fuscae, usque 120 μ longae et ad apicem 20 μ latae Teleuto-sori hypophylli, sparsi, v. seriatim dispositi, diu epidermide tecti, usque 1·5 μ longi, deinde pulverulenti, atri. Teleutosporae clavatae, ellipsoideae v. oblongae, ad apicem rotundatae v. truncatae, rarius subacutae, medio constrictae, ad basim attenuatae v. rotundatae, brunneae, 40–60 × 16–23 μ; episporio leve, 1·5–3 μ crasso, ad apicem haud vel vix (usque 4 μ) incrassato; pedicello crasso, brunneolo, usque 45 μ longo et 6·5 μ crasso.

Hab. in foliis Tristachyae Rehmanni, Kaalfontein, Pretoria District, 13.2.17, leg Pole Evans [10039].

Puccinia Vangueriae sp. nov.

Teleuto-sori hypophylli v. amphigeni, maculis flavidis insidentes, sparsi v. pauci aggregati, subinde confluentes et 2–6 mm. diam., diutius epidermide tecti, pulvinati, compacti, atro-brunnei. Teleutosporae castaneo-brunneae, globosae, sub-globosae vel late ellipsoideae, utrinque late rotundatae, medio haud vel vix constrictae, 24–35 × 17–24 μ; episporio leve, ca. 3·5 μ crasso, ad apicem haud incrassato; pedicello hyalino, flexuoso, usque 130 μ longo, haud raro oblique inserto.

Hab. in foliis Vangueriae pygmaeae Schl., Kaalfontein, Pretoria District, 2.2.16, Pole Evans [9437].

Puccinia Woodiana sp. nov.

Teleuto-sori hypophylli, sparsi vel in parvos greges dispositi, subinde confluentes, usque 1·5 mm. diam., pulvinati, compacti, flavo-brunneoli. Teleutosporae elongatae, ellipsoideae v. sub-clavatae, ad apicem attenuatae vel rotundatae, medio plus minus constrictae, basi leniter attenuatae raro rotundatae, flavidae vel sub-hyalinae, 33–44 × 13–17 μ; episporio ca. 1·5 μ crasso, apice incrassato (usque 7 μ), leve, pedicello sub-hyalino usque 45 μ longo.

Hab. in foliis Oldenlandiae natalensis Hochst., Maritzburg, Natal, 7.4.11, leg. Pole Evans [1409].

Uromyces Argyrolobii sp. nov.

Uredo-sori amphigeni, plerumque hypophylli sparsi v. aggregati, minutissimi, subinde confluentes, rotundati v. elliptici, cinnamomei, epidermide disrupta cincti, pulverulenti. Uredosporae sub-globosae v. late ellipsoideae, brunneae, 18–25 × 16–20 μ; episporio brunneolo, 2–3 μ crasso, breve denseque echinulato, poris germinationis 6 praedito. Teleuto-sori conformes, obscuriores. Teleutosporae obovatae, ovatae v. ellipsoideae, rarius sub-globosae apice rotundatae, basi rotundatae v. sub-attenuatae, 18–27 × 16–22 μ, apice papilla hemispherica aut nulla instructae; episporio 2·5–3 μ crasso, verrucis densis et grossis obsito; pedicello breve, hyalino, deciduo.

Hab. in foliis Argyrolobii amplexicaulis. Mooi River, Natal, 21.3.17, leg. Mogg [10075].

Uromyces Babianae sp. nov.

Teleuto-sori amphigeni, atri, oblongi, minuti, circ. 0.5 mm. longi, seriatim dispositi, subinde etiam confluentes, mox nudi, epidermide disrupta cincti, compacti. Teleutosporae brunneae, sub-globosae, oblongae, ellipsoideae, v. ovatae, apice plerumque rotundatae v. sub-attenuatae, 20–30 × 16–27 μ; episporio leve, 2·5–3·5 μ crasso, apice haud v. leniter (usque 6 μ) incrassato; pedicello persistente, ad apicem pallide brunneolo, usque 50 μ longo et circ. 5 μ crasso.

Hab. in foliis Babianae distichae Ker., Retreat, Cape Province, 2.2.19, leg. Pole Evans [12959].

Uromyces bulbinicola sp. nov.

Teleuto-sori hypophylli v. caulicoli, in greges saepe circinatim dispositi elliptici, usque 2·5 μ longi, subinde confluentes, mox nude, epidermide disrupta cincti vel sub-velati, brunnei, pulverulenti. Teleutosporae sub-globosae v. ellipsoideae, rarius clavatae, plerumque irregulares v. angulatae, brunneae, apice rotundatae v. truncatae, basi rotundatae rarius attenuatae, 15–24 × 15–24 μ; episporio leve, 3–4 μ crasso, apice haud incrassato; pedicello persistente, hyalino, tenue, usque 20 μ longo.

Hab. in foliis Bulbinis bulbosae, National Park, Belair, South Australia, November, 1922, leg. Samuel [18171].

Uromyces bylianus sp. nov.

Teleuto-sori amphigeni, maculis, brunneis insidentes, pluermque circinatim in greges 5–10 mm. longos dispositi, minuti, rotundati v. oblongi, usque 1 mm. longi, subinde confluentes, epidermide diutius tecti. Teleutosporae sub-globosae, ovatae v. late ellipsoideae, castaneo-brunneae, apice rotundatae v. rarius truncatae, basi rotundatae v. attenuatae, 20–34 × 18–27 μ; episporio leve, 1–1·5 μ crasso, plerumque ad apicem usque 5 μ incrassato; pedicello breve, sub-persistente, hyalino.

Hab. in foliis Liliaceae indet., Llewellyn, East Griqualand, 6.9.13, leg. Van der Bijl [6944].

Uromyces capensis sp. nov.

Uredo-sori amphigeni, sparsi, minuti, cinnamomei-brunnei, pulverulenti, epidermide fissa cincti. Uredosporae sub-globosae, ovatae v. late ellipsoideae, fuscae, 18–25 × 16–20 μ; episporio brunneolo, 2–2·5 μ crasso, minute laxeque echinulato, poris germinationis 2 papillatis equatorialibus instructis. Teleuto-sori conformes, obscuriores. Teleutosporae ovate v. ellipsoideae, castaneo-brunneae, apice papilla conica fusca ornatae, basi sub-attenuatae v. rotundatae, 30–40 × 18–22 μ; episporio circ. 3 μ crasso, apice usque 12 μ incrassato, verrucoso; pedicello crasso, hyalino, usque 35–6·5 μ.

Hab. in foliis Oenotherae biennis, Wellington, Cape Province, 27.2.11, leg. Doidge [1221].

Uromyces chloridis sp. nov.

Uredo-sori hypophylli, minuti, fusci, epidermide diu tecti. Uredosporae brunneae late ellipsoideae v. sub-globosae, 23–29 × 20–24 μ; episporio brunneolo, circ. 3 μ crasso, minute verruculose-echinulato, poris germinationis 2–3 sparsis praedito. Teleuto-sori amphigeni, plerumque hypophylli, elongati, atro-brunnei, usque 2 mm. longi, subinde confluentes et usque 1 cm. longi et 1·5 mm. late. Teleutosporae castaneo-brunneae, sub-globosae, late ellipsoideae v. oblongae, apice rotundatae, basi rotundatae v. sub-attenuatae, 22–30 × 20–23 μ, episporio leve, 3–3·5 μ crasso, apice valde incrassato (usque 10 μ); pedicello hyalino v. sub-hyalino, crasso, persistente, circ. 6 μ cr. et usque 120 μ longo.

Hab. in foliis Chloridis virgatae, Bloemfontein, 4·17, leg. Potts [11317].

Uromyecs Ehrhartae-giganteae sp. nov.

Teleuto-sori amphigeni, plerumque culmicoli, ellipsoidei v. oblongi, usque 1 mm. longi v. confluendo majores, atro-brunnei, pulvinati, compacti, epidermide disrupta cincti. Teleutosporae sub-globosae, ovatae, oblongae v. ellipsoideae, castaneo-brunneae, apice rotundatae v. conicae, basi rotundatae v. attenuatae, 23–37 × 16–24 μ, episporio leve, 1·5–2 μ crasso, apice incrassato (plerumque 6–7 μ, rarius usque 10 μ); pedicello hyalino, persistente, circ. 5 μ crasso et usque 120 μ longo.

Hab. in foliis Ehrhartae giganteae, Mowbray, Cape Province, 10.2.14, leg. Van der Merwe [7392].

Uromyces ermelensis sp. nov.

Teleuto-sori sparsi, hypophylli, maculis indeterminis flavidis insidentes v. sine maculis, minuti, rotundati v. oblongi, pulverulenti, cinnamomeo-brunnei, circ. 0·5 mm. diam. Teleutosporae fuscae ellipsoideae v. ovatae, rarius sub-globosae, apice rotundatae, basi rotundatae v. sub-attenuatae, apice plerumque papillula minuta humili hyalina praeditae; episporio 1·5–2 μ crasso, apice haud incrassato, verrucis paucis sparsis aut lineariter ordinatis obsito; pedicello breve, hyalino deciduo.

Hab. in foliis Indigoferae sp., Davel ,Ermelo District, 1912, leg. McCall [5598].

Uromyces Greenstockii Doidge sp. nov.

Teleuto-sori amphigeni, atro-brunnei, minuti, sparsi v. aggregati et circinatim dispositi, pulverulenti, epidermide disrupta cincti. Teleutosporae globosae v. sub-globosae, rarius late ellipsoideae, casteneo-brunneae, ad basim rotundatae, apice papilla sub-hyalino humile instructae, 23–34 × 21–32 μ; episporio 5–5·6 μ crasso, dense minuteque verrucoso; pedicello hyalino, tenue, usque 40 μ longo, sub-persistente.

Hab. in foliis Ipomoeae Greenstockii, Kaalfontein, Pretoria District, 18.4.17, leg. Pole Evans [10989.]

Uromyces Harmsianus (P. Henn.) Doidge.

Syn. *Uredo Harmsiana* P. Henn. in Hedwigia XXXIX, 1900, p. (154); Syd. Monogr. Ured., IV, p. 476.

Uredo-sori hypophylli, sine maculis, laxe gregarii, rotundati, v. elliptici, minuti, epidermide disrupta cincti v. velati, pulverulenti. Uredosporae ellipsoideae v. globosae, fuscae, 22–27 × 20–24 μ; episporio brunneolo, 3–3·5 μ crasso, tenue echinulato, poris germinationis 4–6 sparsis, praedito. Teleuto-sori conformes, obscuriores. Teleutosporae castaneo-brunneae, globosae v. globoso-lenticulares, apice basique rotundatae v. plus minusve compressae, 20–27 × 27–32 μ; membrana interiore brunnea circ. 1·5 μ crassa; tegumento exteriore hyalino v. fusco in aqua intumescente et tunc 5–7 μ crasso inclusae; pedicello deciduo, breve, hyalino.

Hab. in foliis Crotalariae lanceolatae, Scottsburgh, Natal, 5.7.13, leg. Pole Evans [6834].

Uromyces Kentaniensis sp. nov.

Teleuto-sori amphigeni, plerumque hypophylli, circ. 0·5 mm. lati et usque 2 mm. longi, sparsi v. seriatim dispositi, fusci, epidermide semper tecti, compacti. Teleutosporae in greges parvos confertae de paraphysibus dense coalitis fuscis divisis, ovatae, ellipsoideae v. late cuneatae, apice rotundatae truncatae v. obtuse attenuatae, basie attenuatae v. rarius rotundatae pallide brunneae apice obscuriores, 23–34 × 18–27 μ; episporio leve, tenue, circ. 1–1·5 μ cr., apice leniter incrassato (4–5 μ); pedicello hyalino v. pallide brunneolo, persistente, usque 30 μ longo.

Hab. in foliis Antholyzae aethiopicae L., Kentani, Cape Province, leg. Pegler [9313].

Uromyces Lachenaliae sp. nov.

Aecidia amphigena, maculis flavidis insidentia, in greges 4–8 mm. diam. laxiuscule disposita, cupulata, circ. 300 μ diam., margine albido, revoluto, lacerato; cellulae peridii firme conjunctae, polygonae, 25–30 × 15–25 μ, pariete exteriore striato 10–12 μ crasso, interiore verruculoso, 3–4 μ crasso; sporae angulato-globosae v. ellipsoideae, 26–33 × 18–24 μ, membrana hyalina ubique circ. 1·5 μ crassa, dense minuteque verruculosa.

Uredo-sori amphigeni, sparsi v. pauci aggegati, fusci, rotundati vel oblongi, minuti, 0·5–0·75 mm. longi, epidermide disrupta cincti v. subvelati, compacti. Uredosporae subglobosae late ellipsoideae v. ovatae, pallide fuscae v. sub-hyalinae, 23–30 × 20–24 μ; episporio sub-hyalino, circ. 2 μ crasso, dense minuteque echinulato, poris germinationis numerosis (8–12) sparsis praedito.

Teleuto-sori conformes, minores, obscuriores, epidermide diutius tecti. Teleutosporae quoad formam variabiles, ovatae, late cuneatae sub-globosae v. ellipsoideae, saepe irregulares et angulatae, apice rotundatae truncatae v. acutae, basi attenuatae v. rotundatae, castaneo-brunneae, 25–34 × 20–27 μ; episporio leve, 3–3·5 μ crasso, apice haud incrassato; pedicello breve, persistente hyalino v. sub-hyalino, usque 35 μ longo.

Hab. in foliis Lachenaliae pendulae, Municipal Gardens, Capetown, 8.8.12, [5140].

Uromyces pretoriensis sp. nov.

Uredo-sori amphigeni et caulicoli, sparsi, v. confluentes, brunnei, rotundati v. elliptici, usque 1 mm. diam., mox nudi, epidermide disrupta cincti. Uredosporae castaneo-brunneae, globosae, sub-globosae, late ellipsoideae v. oblongae, 23–35 × 23–27 μ; episporio brunneo, 4–5 μ crasso, breve sparseque echinulato, poris germinationis equatorialibus 1–3 plerumque 2. Teleuto-sori plerumque hypophylli, minuti, pauci in greges dispositi, elliptici, epidermide diu tecti, flavido-brunnei, compacti. Teleutosporae pallide brunneae, ellipsoideae, sub-fusoidae v. oblongae, apice conice attenuatae v. rotundatae, basi attenuatae rarius rotundatae 30–45 × 1–17 μ; episporio leve circ. 1·5 μ crasso, apice incrassato (usque 9 μ); pedicello persistente, flavidulo, usque 80 μ longo.

Hab. in foliis Commelinae africanae L., The Willows, Pretoria District, 10.3.12, leg. Pole Evans [2221].

Uromyces Romuleae sp. nov.

Teleuto-sori amphigeni, atri, elliptici, 0·5–0·75 mm. lati, et usque 4 mm. longi, mox nudi epidermide disrupta cincti, compacti. Teleutosporae brunneae, quoad formam sat irregulares, plerumque angulatae, ellipsoidae, oblongae, ovatae v. sub-globosae, apice rotundatae, truncatae v. conice attenuatae, basi-attenuatae v. sub-rotundatae, 22–35 × 16–27 μ; episporio leve, circ. 2 μ crasso, apice incrassato (5–10 μ); pedicello pallide brunneolo, persistente, 5–7 μ crasso et usque 60 μ longo.

Hab. in foliis Romuleae roseae Ecklon, Klapmuts, Cape Province, 31.2.16, leg. van der Byl [10094].

Uromyces Stylochitonis (Cke) Doidge.

Syn. *Aecidium aroideum* Cke. in Grevillea VIII, 1879, p. 71; Syd. Ann. Myc. IV, p. 290.

Teleuto-sori amphigeni, sparsi v. aggregati, minutissimi brunnei, globosi, immersi, et semper epidermide tecti, 60–90 μ diam. Teleutosporae quoad formam irregulares, subglobosae, ellipsoideae, v. ovatae, plerumque angulatae, fuscae, apice rotundatae, truncatae v. acutae, basi rotundatae v. sub-attenuatae, 22–30 × 16–23 μ; episporio leve, 2–2·5 μ crasso, plerumque ad apicem usque 5 μ incrassato; pedicello persistente, breve, usque 25 μ longo.

Hab. in foliis Stylochitonis natalensis, Malvern, Natal, 28.12.11, leg. Doidge [1995].

Aecidium Clematidis brachiatae sp. nov.

Spermogonia copiose evoluta, amphigena plerumque epiphylla, inter aecidia saepe sparsa, mellea, subinde atro-brunnea, 130–150 μ diam. Aecidia plerumque hypophylla dense gregaria, maculis rotundatis v. ellipticis, brunneis insidentia, cupulata, 300–400 μ diam.; margine leniter recurvato, inciso; cellulis peridii firme conjunctis, rhomboideis v. oblongis, 30–45 × 20–27 μ, pariete exteriore striato 4–5 μ crasso, interiore verruculoso, 3–4 μ crasso. Sporae ellipsoideae, ovatae v. sub-globosae, sub-hyalinae, 27–40 × 17–27 μ; episporio 2–2·5 μ crasso, tenuiter verruculoso.

Hab. in foliis Clematidis brachiatae, Fountains, Pretoria District, 28.3.12, leg. Pole Evans [2337].

Aecidium Cluytiae sp. nov.

Spermogonia plerumque hypophylla, inter aecidia sparsa, mellea subinde brunnea, 140–150 μ diam. Aecidia hypophylla, numerosa, immersa, cupulata, 300–400 μ diam., margine leniter recurvato, inciso; cellulis peridii firme conjunctis, rhomboideis 25–35 × 20–25 μ, pariete exteriore striato 6–7 μ crasso, interiore verrucoso 4–5 μ crasso. Sporae angulato-globosae v. ellipsoideae, sub-hyalinae, 16–22 × 15–17 μ, episporio tenuiter verruculoso, 2–2·5 μ crasso.

Hab. in foliis Cluytiae virgatae, Belfast, Transvaal, 4.10.13, Doidge [6968].

Aecidium Corycii sp. nov.

Aecidia amphigena sparsa, minuta cupulata, 150–200 μ diam., margine albido, revoluto, laciniato; cellulis peridii firme conjunctis, rhomboideis v. polygonis, 25–35 × 16–20 μ, pariete exteriore, striato 6–7 μ crasso, interiore verruculoso, 3–4 μ crasso. Sporae subhyalinae, angulato-globosae v. ellipsoideae, 20–22 × 15–17 μ, episporio circ. 1·5 μ crasso, dense minuteque verruculoso.

Hab. in foliis Corycii nigrescentis, Kokstad, East Griqualand, 11.2.20, leg. McLoughlin [12820].

Aecidium Denekiae sp. nov.

Aecidia hypophylla in greges rotundatos usque 1 cm. latos disposita, totam folii superficiem interdum obtegentia, immersa, cupulata, 240–320 μ diam., margine albo, revoluto, lacerato; cellulis peridii firme conjunctis, rhomboideis, 32–40 × 4–20 μ, pariete exteriore tenuiter striato, 5–6 μ crasso, interiore verruculoso, 4–5 μ crasso; sporae subhyalinae, angulato-globosae, ovatae v. ellipsoideae, 16–23 × 13–20 μ, episporio 1·5–2 μ crasso, dense minuteque verruculoso.

Hab. in foliis Denekiae capensis, Mooi River, Natal, 26.10.18, leg. Mogg. [11798].

Aecidium Fluggeae Doidge sp. nov.

Aecidia hypophylla, totam folii superficiem equaliter sparsa, cylindracea, usque 1 mm. longa, 200–300 μ diam.; margine albido, revoluto, lacinato; cellulis peridii firme conjunctis, in series fere regulares dispositis rhomboideis v. quadraticis, 23–30 × 10–20 μ, pariete exteriore leve, 6–7 μ crasso, interiore verruculoso 3–4 μ crasso. Sporae sub-hyalinae, angulato-globosae v. ellipsoideae, 16–24 × 12–17 μ; episporio circ. 1 μ crasso, tenuissime verruculoso.

Hab. in foliis Fluggeae microcarpae, Pillandsberg, 24.12.21, Pole Evans [17298].

Aecidium Gomphostigmae sp. nov.

Pycnidia epiphylla, sparsa, modice copiosa, brunnea, 150–200 μ diam.

Aecidia plerumque hypophylla, singulis etiam epiphylla, per totam folii superficiem aequaliter sparsa, diu vesiculoso-clausa, tandem cupulato-aperta, 250–300 μ diam., margine haud recurvato inciso; cellulis peridii firme conjunctis rhomboideis v. oblongis, imbricatis 30–50 × 16–20 μ, pariete exteriore striato, 6–7 μ crasso, interiore verrucoso 3–4 μ crasso. Sporae sub-hyalinae, angulato-globosae, v. ellipsoideae, 20–35 × 16–20 μ, episporio dense minuteque verruculoso, 2–2·5 μ crasso, apice interdum usque 6 μ incrassato.

Hab. in foliis Gomphostigmae scoparoides, Bushmans River Valley, 21.10.07, leg. Medley Wood [838].

Aecidium Helichrysi sp. nov.

Pycnidia amphigena, plerumque epiphylla, gregaria, mellea deinde brunnea, 100–120 μ diam.

Aecidia hypophylla, maculis indeterminatis insidentia, in greges parvos disposita, cupulata 300–400 μ diam., margine albido erecto inciso; cellulis peridii sub-rhomboideis v. oblongis, 40–50 × 16–20 μ, pariete exteriore striato 3–3·5 μ crasso, interiore verruculoso 3–5 μ crasso. Sporae angulato-globosae v. ellipsoideae sub-hyalinae, 20–30 × 16–20 μ; episporio hyalino 2·5–3 μ crasso, dense minuteque verruculosae.

Hab. in foliis Helichrysi leiopodii var. denudati, Lake Chrissie, Transvaal, 29.11.16, leg. Pole Evans [10128].

Aecidium Impatientis-capensis sp. nov

Spermogonia epiphylla, sparsa v. gregaria, mellea subinde brunnea, 100–120 μ diam. Aecidia hypophylla maculis rotundatis usque 10 mm. diam. insidentia, greges usque 6 mm. diam. circinatim disposita, cupulata, flavida, 240–320 μ diam., margine erecto inciso; cellulis peridii firme conjunctis imbricatis, rhomboideis, 40–50 × 18–22 μ, pariete exteriore tenuiter striato, 9–10 μ crasso, interiore verrucoso, 4–5 μ crasso. Sporae sub-hyalinae, angulato-globosae, v. ellipsoideae, 20–27 × 16–18 μ, episporio 1·5–2 μ crasso, dense minuteque verruculoso.

Hab. in foliis Impatientis capensis, Edendale, Natal, 26.12.11, leg. Doidge [1990].

Aecidium Nidorellae sp. nov.

Pycnidia amphigena, mellea, subinde brunnea, 120–140 μ diam. Aecidia plerumque hypophylla, maculis brunneis usque 12 mm. longis insidentia, in greges orbiculares v. ellipticos plus minusve circinatim disposita, breviter cylindracea, 240–360 μ diam., margine albo reflexo, lacerato; cellulis peridii firme conjunctis, rhomboideis, 30–40 × 16–20 μ, pariete exteriore leve, 6–7 μ crasso, interiore tenuiter verruculoso 2–3 μ crasso. Sporae sub-hyalinae, angulato-globosae, ovatae v. ellipsoideae, 20–27 × 16–20 μ; episporio circ. 1·5 μ crasso, apice interdum leniter incrassato (usque 3 μ), dense minuteque verruculoso.

Hab. in foliis Nidorellae hottentoticae var. lanatae, Irene, Pretoria District, 6.1.22, legg. Pole Evans [15048].

Aecidium Osteospermi sp. nov.

Aecidia amphigena, plerumque hypophylla, totam folii superficiem laxiuscule obtegentea, breviter cylindracea, usque 0·5 mm. longo et 200–250 μ diam., margine albido, reflexo inciso; cellulis peridii firme conjunctis, sub-rhomboidei v. oblongis, 23–40 × 20–23 μ, pariete exteriore striato, 7–10 μ crasso, interiore striato, 7–10 μ crasso, interiore dense minuteque verruculoso 4–5 μ crasso. Sporae angulato-globosae v. oblongae, subhyalinae, 20–29 × 12–19 μ, episporio 2–2·5 μ crasso, apice leniter (3–3·5 μ) crassiore, tenuiter verruculoso.

Hab. in foliis Osteospermi moniliferi, Lion's Head, Capetown, 13.11.12, leg. Saxton [6587].

Aecidium Pachystigmae sp. nov.

Aecidia amphigena, plerumque hypophylla, maculis indeterminatis brunneis insidentia, greges parvos usque 25 mm. diam., disposita, cupulata, 240–300 μ diam., margine reflexe, albido, inciso; cellulis peridii rhomboideis, 30–40 × 16–20 μ, pariete exteriore striato, 8–10 μ crasso, interiore verrucoso, 3–4 μ crasso. Sporae sub-hyalinae, angulato, globosae, ovatae v. late ellipsoideae, 17–25 × 15–19 μ; episporio dense minuteque verruculoso, circ. 1·5 μ crasso, apice saepe usque 5 μ incrassato.

Hab. in foliis Pachystigmae Zeyheri, Hennops River, Pretoria District, 5.1.11, leg. Pole Evans [1063].

Aecidium Pienaarii sp. nov.

Aecidia baccicola, dense gregaria et superficiem totam saepe obtegentia, immersa, diu vesiculoso-clausa, tandem cupulato-aperta, 200–250 μ diam., margine albido, denticulato; cellulis peridii firme conjunctis in series fere regulares dispositis, sub-rhomboideis v. quadraticis, 22–30 × 16–22 μ, pariete exteriore striato 4–5 μ crasso, interiore verruculoso, 3–4 μ crasso. Sporae sub-hyalinae, angulato-globosae v. ellipsoideae, 16–24 × 15–17 μ; episporio 1–1·5 μ crasso, dense minuteque verruculoso.

Hab. in foliis Pavettae asimilis, Garstfontein, Pretoria District, 25.3.11, leg. Pienaar [1259].

Aecidium Pottsii sp. nov.

Spermogonia epiphylla, gregaria, v. amphigena, inter aecidia sparsa, mellea, subinde brunnea, 120–150 μ diam. Aecidia hypophylla totam folii superficiem equaliter sparsa, breviter cylindracea, immersa, 0·4–0·7 mm. longa, 300–400 μ diam., margine albido, lacerato; cellulis peridii firma conjunctis in series fere regulares dispositis, subrhomboideis v. polygonis, imbricatis, 30–40 × 16–20 μ, pariete exteriore striato, 9–10 μ crasso, interiore verrucoso 4–5 μ crasso. Sporae sub-hyalinae, angulato-globosae v. ellipsoideae, 17–23 × 13–20 μ; episporio 1·5–2 μ crasso dense minuteque verruculoso.

Hab. in foliis Euphorbiae natalensis, Lidgetton, Natal, 13.10.19, leg. Mogg [17034].

Aecidium pretoriense sp. nov.

Aecidia hypophylla, praecipue utrinque nervum sequentia, cylindracea, circ. 1 mm. longa, 350–400 μ diam., margine reflexo, laciniato; cellulis peridii firme conjunctis, rhomboideis v. polygonis, 40–50 × 16–24 μ, pariete exteriore tenuiter striato 4–5 μ crasso, interiore verrucoso 3–4 μ crasso. Sporae oblongae, ellipsoideae v. angulato-globosae, sub-hyalinae, 20–33 × 13–23 μ; episporio dense minuteque verruculoso, 2·5–3 μ crasso, apice interdum leniter (usque 5 μ) incrassato.

Hab. in foliis Hedyotidis Amatymbicae, Groenkloof, Pretoria, 32.11.21, leg. Pole Evans [15043].

Aecidium Vernoniae-monocephalae sp. nov.

Aecidia amphigena v. caulicola maculis flavidis indeterminatis insidentia, in greges rotundatis v. oblongis 5–12 μ longis disposita, cylindracea, circ. 1mm. longa, 300–350 μ diam., margine albido, lacerato, recurvato; cellulis peridii firme conjunctis, imbricatis, rhomboideis, 40–70 × 20–30 μ, pariete exteriore leve 8–10 μ crasso, interiore striato-verruculoso, 4–5 μ crasso. Sporae sub-hyalinae, sub-globosae v. ellipsoideae, 20–3p × 16–20 μ, episporio hyalino, dense minuteque verruculose 2–2·5 μ crasso.

Hab. in foliis Vernoniae monocephalae, Kaalfontein, Transvaal, 24.1.17, leg. Pole Evans [10041].

Aecidium Vernoniae-podocomae sp. nov.

Aecidia amphigena, maculis parvis flavidis insidentia, solitaria v. in greges parvos usque 2 mm. diam. disposita, immersa, diu vesiculoso-clausa, tandem ampullaceo-aperta, 200–250 μ diam. margine albido, recurvato, inciso; cellulis peridii rhomboideis 20–30 × 13–20 μ, pariete exteriore tenuiter striato 4–5 μ crasso, interiore verruculoso circ. 3 μ crasso. Sporae sub-globosae v. ellipsoideae, angulatae, sub-hyalinae 17–27 × 15–23 μ; episporio 2·5–3 μ crasso, dense minuteque verruculoso.

Hab. in foliis Vernoniae podocomae, Barberton, Transvaal, 29.8.11, leg. Pole Evans [1857].

Aecidium Woodianum sp. nov.

Aecidia plerumque hypophylla maculis brunneis indeterminatis 3–5 mm. latis insidentia, in greges parvos disposita, cupulata, 200–300 μ diam., margine albo, reflexo, inciso; cellulis peridii firma conjunctis, rhomboideis, 30–40 × 13–17 μ, pariete exteriore striato 6–7 μ crasso, interiore verruculoso, 4–5 μ crasso; sporae sub-hyalinae, angulato-globosae v. ellipsoideae, 16–24 × 13–20 μ episporio 1–1·5 μ crasso, dense minuteque verruculoso.

Hab. in foliis Feliciae sp., Belfast, Transvaal, February, 1909, leg. Doidge [556].

Caeoma Heteromorphae sp. nov.

Spermogonia inter aecidia sparsa modice copiosa mellea, 120–140 μ diam. Aecidia hypophylla pustulas galliformes usque 3 mm. diam. efficientia v. in petioles tumores etiam galliformes usque 7 mm. longos generantia, flavida profunde immersa, semper tecta, sub-globosa, 300–400 μ diam. Sporae sub-globosae, angulatae v. ellipsoideae, 22–27 × 20–24 μ, episporio hyalino circ. 3 μ crasso, sparse verruculoso-echinulato.

Hab. in foliis Heteromorphae arborescentis, Port Elizabeth, 22.9.16, leg. Drege [9822].

Uredo Alysicarpi sp. nov.

Sori hypophylli, maculis nullis, sparsi, minuti, cinnamomeo-brunnei, rotundati v. oblongi in tomento folii nidulantes, epidermide fissa cincti, pulverulenti. Sporae sub-globosae v. ovate, flavido-brunneae 18–22 × 16–20 μ; episporio flavido-brunneo, 2–5 μ crasso, minute verruculoso, poris germinationis 3–4 sparsis praedito.

Hab. in foliis Alysicarpi rugosi, Olifantsfontein, Transvaal, 21.2.20, leg. Pienaar [12821].

Uredo Asclepiadis-fruticosi sp. nov.

Sori hypophylli v. caulicoli, sparsi v. aggregati, saepe numerosissimi et tunc paginam folii inferiorem dense obtegentes, minuti, cinnamomeo-brunnei, rotundati v. irregulares, epidermide fissa cincti, pulverulenti. Sporae fuscae, obovatae v. ellipsoidaee, rarius sub-globosae, 20–28 × 13–19 μ; episporio flavidulo, circ. 3 μ crasso, breve sparseque echinulato, poris germinationis 2 equatorialibus praedito.

Hab. in foliis Asclepiadis fruticosi, Armadillo Creek, Vryburg District, 17.11.11, leg. Burtt-Davy [1938].

Uredo Brachylaenae sp. nov.

Sori hypophylli, maculis minutis flavidis insidentes, minuti sparsi, discreti, fusci; paraphysibus numerosis cincti; paraphyses cylindraceae v. sub-clavatae, rectae v. leniter curvatae, septatae, apice pallide flavo-brunneae, basi sub-hyalinae, usque 100 μ longae, apice 10–17 μ latae, membrana 2·5–3·5 μ crassae. Uredosporae sub-globosae, late ellipsoideae v. ovatae, pallide flavo-brunneae, 18–23·5 × 15–17 μ; episporio flavidulo, circ. 1 μ crasso, minute sparseque verruculoso-echinulato.

Hab in foliis Brachylaenae discoloris, Umgeni Beach, Durban, 7.7.12, leg. Doidge [2525].

Uredo Indigoferae sp. nov.

Sori amphigeni plerumque hypophylli, sparsi, minuti, rotundati, cinnamomeo-brunnei epidermide bullata diu tecti, tandem aperti, et epidermide fissa cincti v. sub-velati. Sporae brunneae, sub-globosae v. late ellipsoideae, 20–23 × 16–19 μ; episporio flavido-brunneo, poris germinationis 3–4 praedito.

Hab. in foliis Indigoferae endecaphyllae, Wagendrift, Pretoria District, 21.1.18, leg. Doidge [11330].

Uredo Lonchocarpi sp. nov.

Sori amphigeni et legumicoli in foliis maculas brunneas usque 1·5 cm. diam., efficientes et pustulas galliformes v. pulvinatas formantes, sub-epidermales, minutissimi, dense aggregati confluentesque, ferruginei. Sporae ovatae, late ellipsoideae v. sub-globosae, pallide brunneae, 25–35 × 16–25 μ; episporio flavidulo, basi 3–4 μ crasso, apice 5–8 μ crasso, sparse crasseque echinulato, poris germinationis 4 equatorialibus praedito. Paraphyses copiosissime evolutae, clavatae ad apicem curvatae v. cochleatae, pallide flavo-brunneae, usque 100 μ longae et apice circ. 10 μ crassae.

Hab. in foliis Lonchocarpi Capassae, Umbelusi, Portuguese East Africa, 3.8.08, leg. Howard [532].

Uredo Lotononi sp. nov.

Sori hypophylli et caulicoli, minuti sparsi, oblongi, epidermide bullata diu tecti, tandem nudi, pulverulenti, brunnei. Sporae fuscae, sub-globosae v. ovatae, 20–25 μ diam., episporio 1·5 μ crasso, brunneolo, tenuiter sparseque echinulato, poris germinationis 3–4 papillatis equatorialibus praedito.

Hab. in foliis Lotononis cytisoidis, Mont aux Sources, Natal, 20.4.19, leg. Mogg [12955].

List of works referred to additional to those quoted under the several species and including the chief papers on South African Uredinae.

1. Arthur, J. C.—The Aecidium of the Maize Rust, Bot. Gazette 38, p. 64, 1904.
2. —— North American Flora, Vol. 7, Uredinales, Part 2, 1907 and Part 6, 1921.
3. —— North American Flora, Vol. 7, Uredinales, Parts 9 and 10, 1924–25.
4. Arthur, J. C., and Fromme, F. D.—North American Flora, Vol. 7, Uredinales, Part 4, 1920.
5. Arthur, J. C., Fromme, F. D., and Kern, F. D.—North American Flora, Vol. 7, Uredinales, Part 5, 1920.
6. Arthur, J. C., and Jackson, H. S., North American Flora, Vol. 7, Uredinales, Part 8, 1922.
7. Arthur, J. C., Jackson, H. S., and Orton, C. R.—North American Flora, Vol. 7, Uredinales, Part 6, 1921.
8. Arthur, J. C., and Kern, F. D.—North American Flora, Vol. 7, Uredinales, Part 3, 1912.
9. Arthur, J. C., Mains, E. B., Bisby, G. R., and Jackson, H. S.—North American Flora 7, Uredinales, Part 7, 1922.
10. Biffen, R. H.—Mendel's Laws of Inheritance and Wheat Breeding, Journ. Agric. Sci. 1, p. 4, 1905.
11. —— Studies in the inheritance of disease resistance I, Journ. Agric. Sci. 2, p. 109, 1907; II, ibid. 4, p. 421, 1912.
12. Bottomley, A. M.—An Account of the Natal fungi collected by J. Medley Wood, South African Jour. Sci. 14, 1917.
14. —— Three Natal Fungi, Grevillea, 17 (1888–89), p. 70.
15. Cunningham, G. H.—The Uredineae or Rust Fungi of New Zealand, Part I, Pucciniaceae, Tribe Puccineae, Trans. New Zealand Institute, 54, pp. 619–704, 1923.
16. —— Relation of Biologic Specialisation in the Taxonomy of the Grass rusts, New Zealand Jour. Sci. and Technology 6, pp. 157–163, 1923.
17. —— The Uredinales or Rust Fungi of New Zealand, Supplement to Part I and Part 2, Trans. New Zealand Institute, Vol 55, pp. 1–58, 1924.
18. —— Third Supplement to the Uredinaceae and Ustilaginaceae of New Zealand, New Zealand Institute 56, pp. 74–80, 1926.
19. Grove, W. B.—The British Rust Fungi (Uredinales), Cambridge, 1913.
20. Hennings, P.—Fungi Africae orientalis, Engl. Bot. Jahrb. 28, pp. 318–329, 1901.
21. —— Fungi Africae orientalis III, Engl. Bot. Jahrb. 34 (1905), pp. 39–57; IV, Ibid 38 (1907), pp. 102–118.
22. —— Enige neue parasitische Pilze aus Transvaal von Herrn. T.B.R. Evans gesammelt., Engl. Bot. Jahrb. 41, pp. 270–273, 1908.
23. Kalchbrenner, C.—Fungi MacOwaniani, Grevillea 9 (1880–81), pp. 107–116 and 143–147.
24. Kalchbrenner, C., and Cooke, M. C.—South African Fungi, Grevillea 9, (1880–1881), 17–34.
25. MacAlpine, D.—The rusts of Australia, Melbourne, 1906.
26. Pole Evans, I. B.—Infection Phenomena in various Uredineae, Rept. Brits. Ass. Adv. Sci., 1905, p. 595.
27. —— Coffee Rust (Hemileia vastatrix Berk et Br.), Rept. of the Plant Pathologist in Ann. Rept. Transv. Dept. Agric., 1906–7, p. 165.
28. —— The Cereal Rusts I, The development of their Uredo mycelia, Ann. Bot. XXI, p. 443, 1907.

29. Pole Evans, I. B.—On the systematic position of Aecidium elegans Diet. Rept. of S. African Ass. for the Adv. Sci., 1908, p. 252 (1909).

30. —— Brown Rust of Maize (Puccinia Maydis Bereng), Rept. of the Plant Pathologist and Mycologist in Ann. Rept. S. African Dept. Agric., 194.

31. —— South African Cereal Rusts, with observations on the problem of breeding rust-resistant wheats, Journ. Agric. Sci. 4, p. 95, 1911.

32. —— The South African Rust Fungi I, The species of Puccinia on Compositae, Transv. Roy. Soc. South Africa V, 637–646, 1915.

33. Pole Evans, Mary.—Rusts in South Africa, I a sketch of the life-cycle of the rust on Besem Gras and Wild Sweet Pea, Union of South Africa, Sci. Bull. No. 1 of 1923.

II. A sketch of the life-cycle of the rust on mealie and Oxalis, Ibid, No. 2 of 1923.

34. Stakman, E. C., and Piemeisel, F. J.—Biologic Forms of Puccinia graminis on Cereals and Grasses, Jour. Agric. Research, 10, pp. 424–495, 1917.

35. Stakman, E. C., Piemeisel, F. J., and Levine, M. N.—Plasticity of Biologic forms of Puccinia graminis, Jour. Agric. Res. 15, pp. 221–249, 1918.

36. Sydow, H.—Die Verwertung der Verwandschaftverhältnisse und des gegenwärtigen Entwicklungsganges zur Umrenzung der Gattungen oei den Uredineen, Ann. Myc. 19 (1921), pp. 161–175.

37. —— Weitere Mitteilungen zur Umrenzung der Gattungen bei Uredineen, Ann. Myc. 20 (1922), pp. 109–125.

38. —— Beschreibungen neuer südafrikanischer Pilze IV and V, Ann. Myc. 22 (1924), pp. 235 and 419.

29. Sydow, H. and P.—Monographia Uredinarum—

Vol. I, 1904.
„ II, 1910.
„ III, 1915.
„ IV, 1924.

40. —— Enige neue resp. bermerkswerte Pilze aus Südafrika, Ann. Myc. 7 (1909), p. 543.

41. —— Beschreibungen neuer südafrikanischer Pilze, Ann. Myc. 10 (1912), p. 33.

42. —— Beschreibungen neuer südafrikanischer Pilze III, Ann. Myc. 12 (1914), p. 263.

43. —— Uber enige Uredineen mit quellbaren Membranen und erhöhter Keimporenzahl. Ann. Myc. 17 (1919), 101–107.

Plate I.

PUCCINIA MAYDIS.

S. Gower, del.

a. Tip of young maize leaf showing uredo-sori.
b. Enlarged view of uredo-sori on maize leaf.

Plate II. *S. Gower, del.*

Part of leaf of *Zea mays* showing teleuto-sori of *Puccinia maydis*.

Plate III. *S. Gower. del.*

Normal shoot of *Vigna angustifolia.*

Plate IV. *S. Gower, del.*

PUCCINIA TRISTACHYAE.

a. Shoot of *Vigna angustifolia* bearing aecidia.
b. Slightly enlarged.
c. A much enlarged view of a group of aecidia.

Plate V. *S. Gower, del.*

PUCCINIA TRISTACHYAE ON TRISTACHYA REHMANNI.

a. Uredo-sori.
b. Teleuto-sori.
c. Enlarged view of uredo-sori.

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